

Table of contents

Instructions: W0010049

Product: NCB alternator

Part no.: 0 124 5.. ..

Special features	I02/1
Structure, usage	I07/1
General information	I08/1
Safety measures	I10/1
Testers, equipment, tools	I12/1
Test specifications	I14/1
Tightening torques	I15/1
Circuit diagram	I16/1
Alternator disassembly/testing table	I22/1
Component cleaning	II22/1 II24/1
Alternator assembly table	III09/1

Continue: I01/2

Table of contents

Editorial note	IV02/1
----------------	--------

Continue: I01/1

These instructions describe repair procedures and contain the corresponding test specifications for the following alternators

Type: NCB1 14V 120A
NCB1 14V 52-108A
NCB1 14V 70-120A
NCB2 14V 150A

SPECIAL FEATURES

These repair instructions were compiled on the basis of the following alternator

The different alternator versions can be seen from the appropriate parts lists.

102

SPECIAL FEATURES

Alternators of this type are equipped with a multi-function regulator.

Multi-function regulators feature the following:

- Voltage actual value and excitation current via connection B+
- Pre-excitation clocked via B+
- Connection/terminal L (recognition of ignition switch ON, fault display)
- Load response/starting (no supply of current during and immediately after starting; optional)

Continue: I03/2

SPECIAL FEATURES

- Load response/driving (power supply constantly increased via ramp; optional)
- Connection/DF monitor (evaluation of current alternator load; optional)
- Connection/terminal S (battery "Sense", voltage signal directly from battery; optional)
- Thermal regulation of regulator voltage (optional)

Continue: I04/1

SPECIAL FEATURES

NOTE:

If checking with oscilloscope reveals that rectifier unit is OK, it is not necessary to separate rectifier unit/stator.

Never block fan and pulley with a screwdriver or the like when dismantling or assembling. Bent or damaged fan blades will cause damage to the alternator.

Continue: I04/2

SPECIAL FEATURES

The entire assembly is geared to the alignment of the V-belt. Modifications or assembly errors can lead to damage.

Continue: I05/1

SPECIAL FEATURES

The alternator housing is made of die-cast aluminum. Particular care is to be taken on dismantling and assembly as the housing is susceptible to damage. Deformation and surface damage may permanently impair the fit accuracy of the alternator components. This can result in damage to the alternator during operation.

Continue: I05/2

SPECIAL FEATURES

After performing repairs, the function of the alternator is to be checked on a suitable test bench.

Continue: I06/1

SPECIAL FEATURES

Explanatory notes on alternator
labelling e.g.: NCB1 -> 14V 70-120A

N => Size

G	=	100	...	109	mm
K	=	120	...	129	mm
N	=	130	...	142	mm

C => Type of alternator
Compact alternator

B => Design principle

1 => Size classification

Continue: I06/2

SPECIAL FEATURES

NCB1 -> 14V 70-120A

-> => Direction of rotation

->	or R	=	Clockwise
<-	or L	=	Counter- clockwise
<->	or RL	=	Clockwise and counter-clockwise

14V => Alternator voltage in volts

70- => Rated current in A measured at
n = 1800 min⁻¹

120A => Rated current in A measured at
n = 6000 min⁻¹

Continue: I01/1

STRUCTURE, USAGE

PC user prompting:

Position cursor on button and confirm.

Microcard user prompting:

User prompting is provided on every page e.g.:

- Continue: I 17/1

- Continue: II 18/1 Fig.: II 17/2

Brief instructions may include several rows of coordinates.

I../. = first coordinate row

II../. = second coordinate row

III../. = third coordinate row

etc.

.../1 = upper coordinate half

.../2 = lower coordinate half

Continue: I01/1

GENERAL

Expert repairs are only possible using the prescribed tools and measuring instruments, which are in perfect working order. We therefore recommend that exclusive use be made of the tools listed.

The use of incorrect and unsuitable tools and testers can lead to injury and may damage the product concerned or its component parts.

Continue: I08/2

GENERAL

Exclusive use is to be made of service parts as per applicable parts list for type of alternator concerned.

To ensure proper functioning, use must be made of the materials prescribed in these instructions.

Ensure absolute cleanliness when performing repair work.

Continue: I09/1

GENERAL

Tester and object being tested must be at room temperature for all checks performed during repair work.

The stated test values are referenced to a temperature of 20 C.

Continue: I01/1

SAFETY MEASURES

ATTENTION: DANGER OF FIRE

For transmitter and receiver interference suppression purposes, alternators are fitted with capacitors with a long storage time.

When washing out alternator components, immersion in cleaning fluid may result in capacitor discharge and cause flammable liquids to ignite.

Continue: I10/2

SAFETY MEASURES

For this reason, components with capacitors are only to be washed out using cleaning agents (e.g. HAKU 1025/6) which are not readily flammable.

Continue: I11/1

SAFETY MEASURES

Always heed the following safety regulations:

- * German Order governing the use of flammable liquids (VbF).
 - * Accident prevention regulations for electrical systems and equipment.
 - * Safety regulations for the handling of chlorinated hydrocarbons:
 - For companies: ZH 1/222
 - For employees: ZH 1/129
- issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

Continue: I11/2

SAFETY MEASURES

Outside Germany, pay attention to appropriate local regulations.

Skin protection:

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

Continue: I01/1

TESTERS, FIXTURES, TOOLS

Testers, measuring instruments

Alternator	0 684 201 200
tester:	(WPG 012.00)

Interturn short circuit	
tester:	0 986 619 110

Test prods:	0 986 619 101
(old version	0 986 619 114)

Universal measuring	
instrument MMD 302:	0 984 500 302
or	
Electrical system	0 684 101 400
tester:	(ETE 014.00)

Continue: I12/2

TESTERS, FIXTURES, TOOLS

Testers, measuring instruments

Dial gauge:	1 687 233 011
-------------	---------------

Magnetic measurement	4 851 601 124
stand:	(T-M 1)

Two V-blocks:	comm. avail.
---------------	--------------

Continue: I13/1

TESTERS, FIXTURES, TOOLS

Tools, fixtures

Socket wrench:	0 986 618 152 (KDLJ 6030)
Disassembly tool:	0 986 619 396
M10 multi-point socket, long version:	comm. avail.
Support piece and pressing-in sleeve:	0 986 618 162 (KDLJ 6044)
Mandrel press:	comm. avail.

Continue: I13/2

TESTERS, FIXTURES, TOOLS

Tools, fixtures

Two-arm puller:	comm. avail.
Torque wrench:	comm. avail.
Soldering iron 180 W:	comm. avail.
High-temperature solder (min. 480 C):	comm. avail.
Solder cream:	comm. avail.

Continue: I01/1

TEST SPECIFICATIONS

Mechanical test specifications

Diameter of collector rings

New: 15,6 mm

Min.: 14,9 mm

Max. radial run-out of collector rings:

0,03 mm

Max. radial run-out at rotor OD:

0,05 mm

Carbon brush projection at regulator

New: 13,2 mm

Min.: 6 mm

Continue: I14/2

TEST SPECIFICATIONS

Electrical test specifications

Interference-suppression

capacitor: 2,0...2,4 microfarads

Stator resistance:

< 0,1 Ohm

Rotor resistance:

1,8...2,8 Ohm

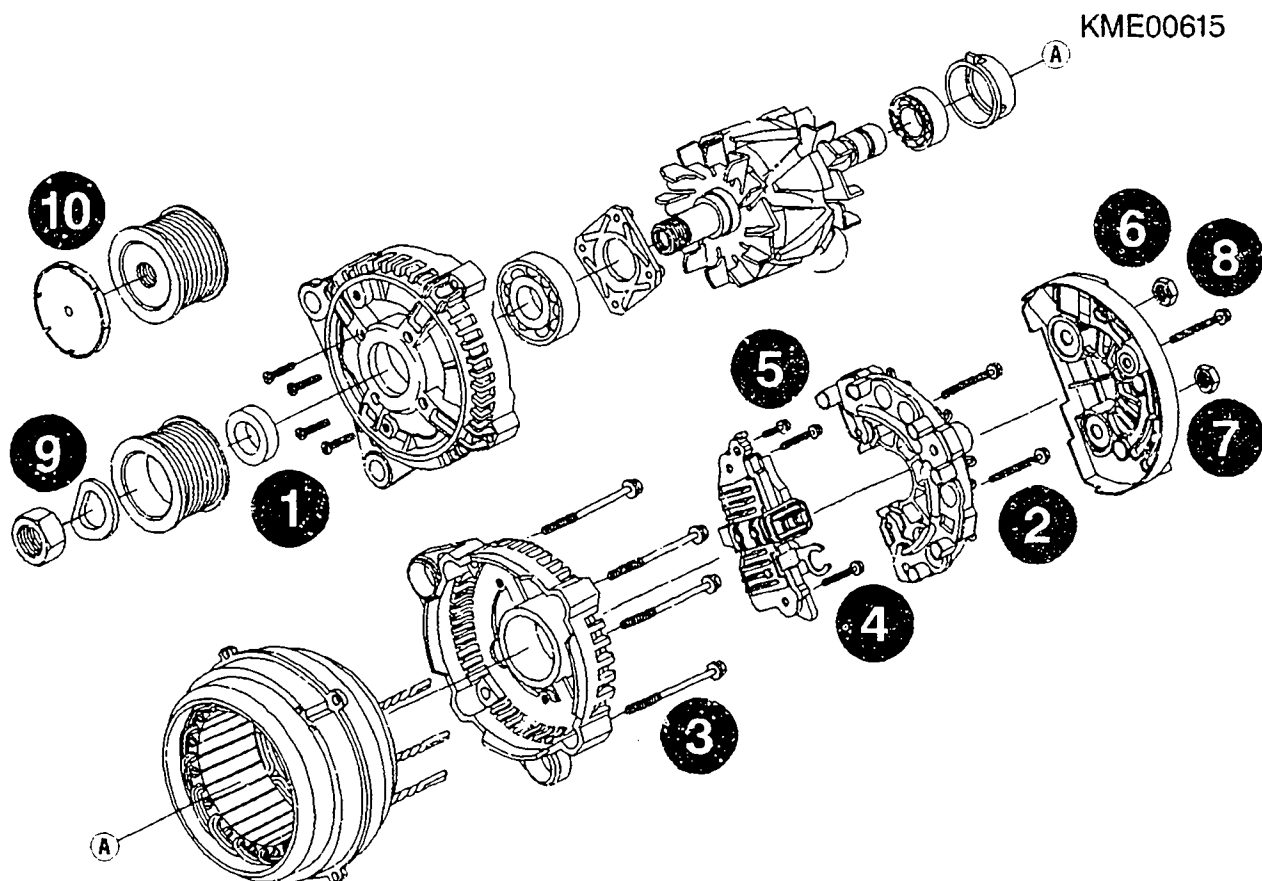
Continue: I01/1

TIGHTENING TORQUES

Tightening torques for attachment of

1 = Cover plate:	2,7...3,5 Nm
2 = Rectifier unit:	3,5...4,3 Nm
3 = End shields:	4,5...5,5 Nm
4 = Regulator:	1,6...2,3 Nm
5 = Connection V:	0,9...1,4 Nm
6 = Long B+:	18...20 Nm
7 = Short B+:	11...13 Nm
8 = Protective cap:	3,5...4,3 Nm
9 = Pulley:	60...70 Nm
10 = Free-wheel pulley:	75...85 Nm

Continue: I01/1 Fig.: I15/2



CIRCUIT DIAGRAM

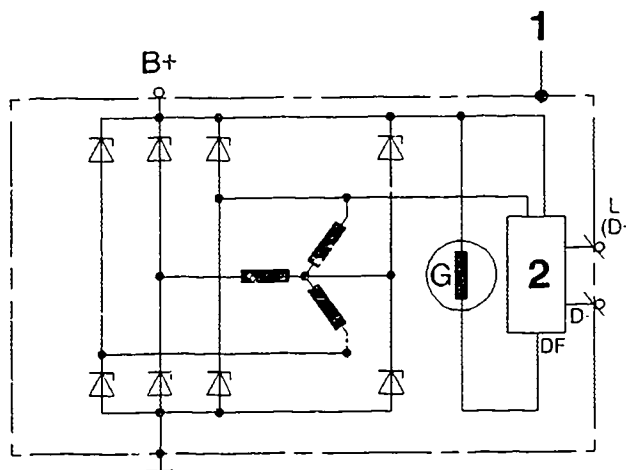
Rectifier unit version 1

1 = Alternator

2 = Regulator

Continue: I17/1 Fig.: I16/2

KME00607



CIRCUIT DIAGRAM

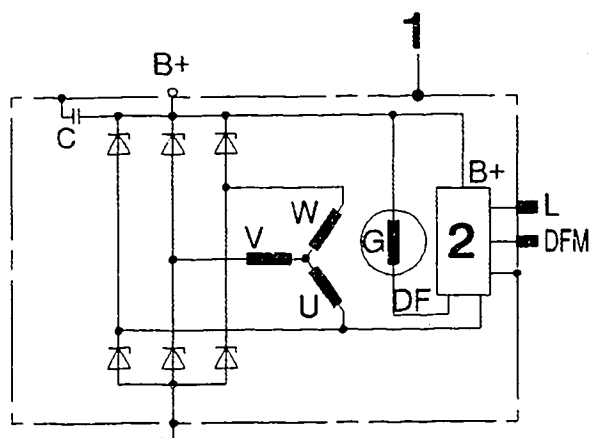
Rectifier unit version 2

1 = Alternator

2 = Regulator

Continue: I18/1 Fig.: I17/2

KME00608



CIRCUIT DIAGRAM

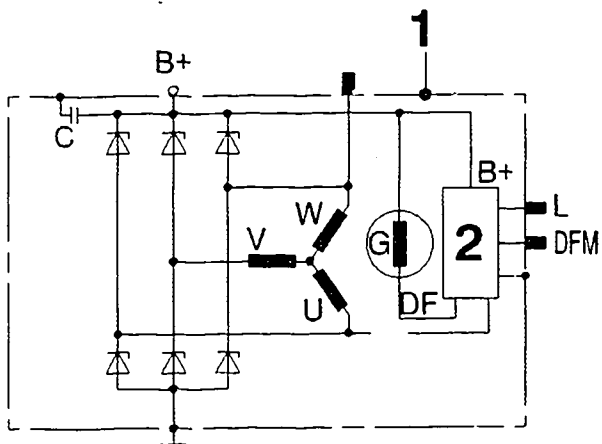
Rectifier unit version 3

1 = Alternator

2 = Regulator

Continue: I19/1 Fig.: I18/2

KME00609



CIRCUIT DIAGRAM

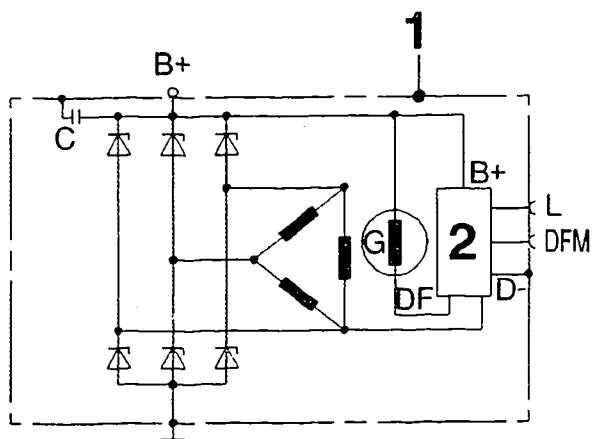
Rectifier unit version 4

1 = Alternator

2 = Regulator

Continue: I20/1 Fig.: I19/2

KME00610



CIRCUIT DIAGRAM

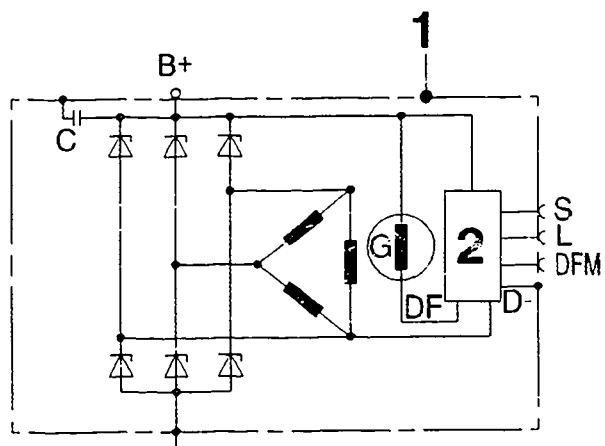
Rectifier unit version 5

1 = Alternator

2 = Regulator

Continue: I21/1 Fig.: I20/2

KME00661



CIRCUIT DIAGRAM

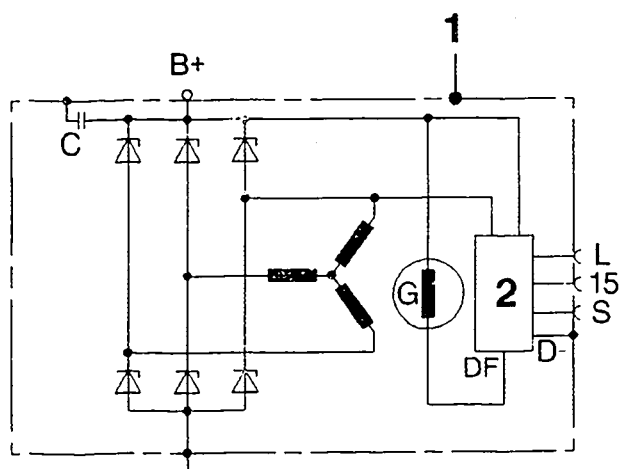
Rectifier unit version 6

1 = Alternator

2 = Regulator

Continue: I01/1 Fig.: I21/2

KME00662



ALTERNATOR DISASSEMBLY/CHECKING
TABLE

Disassembling pulley	I23/1
Disassembling protective cap	I27/1
Disassembling regulator	II02/1
Checking (installed) rectifier unit	II04/1
Checking (installed) stator	II06/1
Disassembling drive end shield	II07/1
Disassembling rotor	II10/1
Disassembling deep-groove ball bearing of drive end shield	II12/1

Continue: I22/2

ALTERNATOR DISASSEMBLY/CHECKING
TABLE

Disassembling deep-groove ball bearing of collector ring end shield	II15/1
Disassembling rectifier unit	II17/1
Disassembling stator	II21/1

Continue: I01/1

DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling pulley

Remove cap (1) of pulley (2).

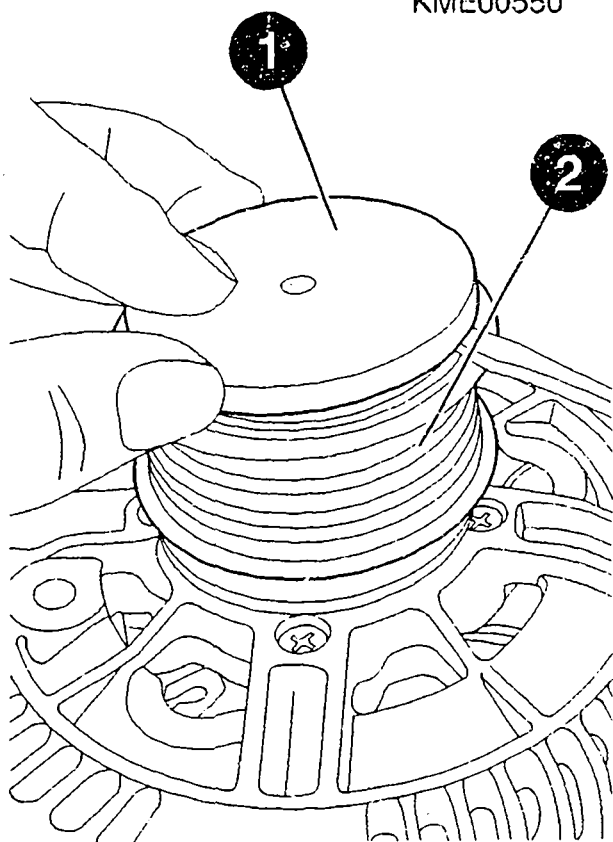
NOTE:

Cap is either pressed in or clipped on.

Clip-on cap can be removed using a suitable tool.

Continue: I24/1 Fig.: I23/2

KME00550



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling pulley

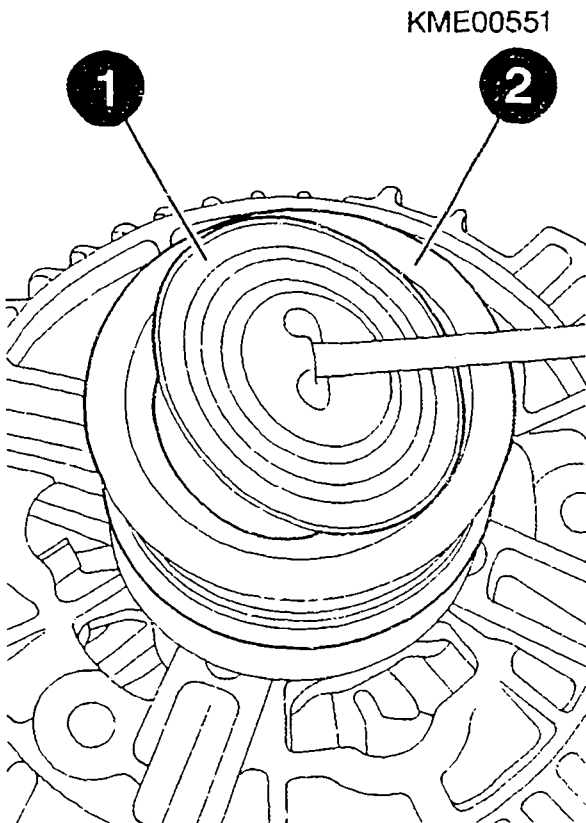
Remove cap (1) of pulley (2).

NOTE:

Cap is either pressed in or clipped on.

A pressed-in cap can only be removed by piercing it and prising it out.

Continue: I25/1 Fig.: I24/2



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling pulley

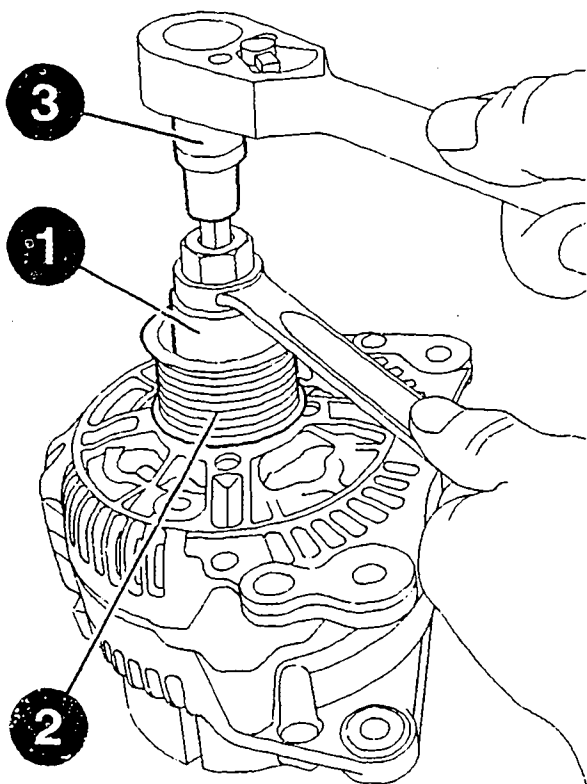
Attach socket wrench (1) to nut of pulley (2). Hold rotor shaft of alternator with multi-point wrench (3) and unfasten nut using 22 mm box wrench.

Detach pulley and spring lock washer.

Socket wrench:	0 986 618 152
M10 multi-point socket, long version:	comm. avail.

Continue: I26/1 Fig.: I25/2

KME00552



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling pulley (free-wheel pulley)

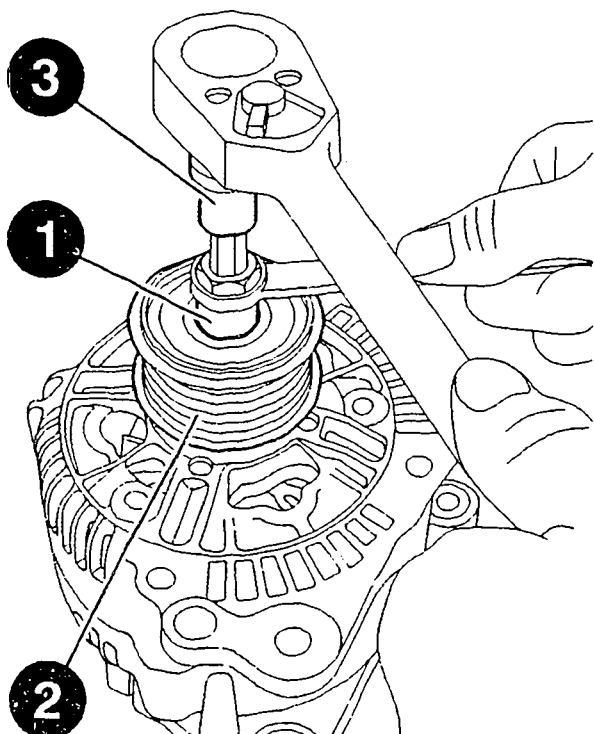
Insert disassembly tool (1) in grooved tothing of free-wheel pulley (2). Hold rotor shaft of alternator with multi-point wrench (3), unfasten free-wheel pulley by means of disassembly tool using 17 mm box wrench and detach.

Disassembly tool:
M10 multi-point socket,
long version:

0 986 619 396
comm. avail.

Continue: I22/1 Fig.: I26/2

KME00553



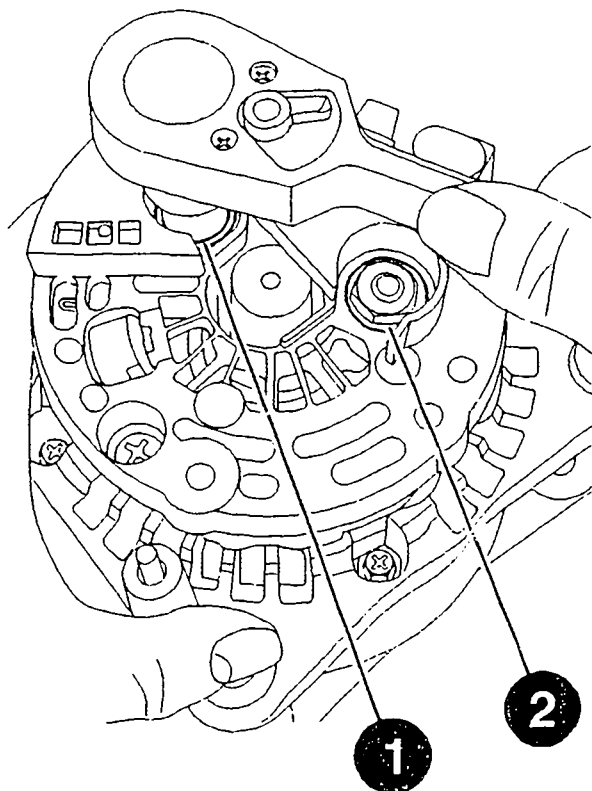
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling protective cap

Unfasten long B+ (1) and short B+ (2) connections.

Continue: I28/1 Fig.: I27/2

KME00616



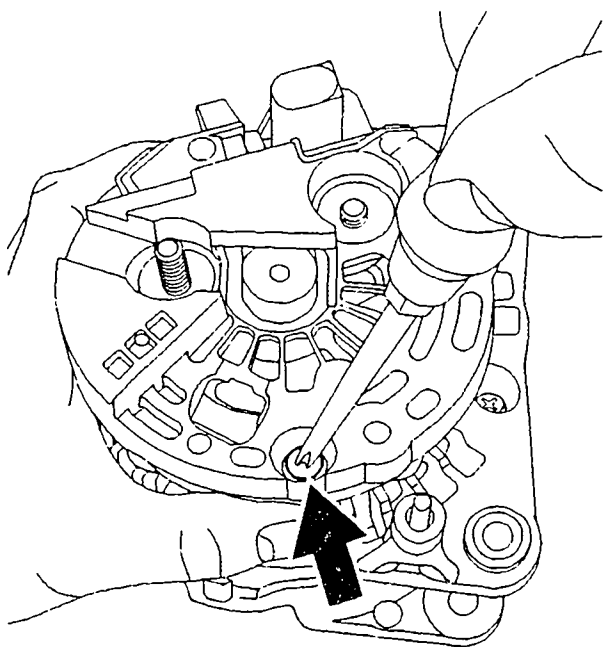
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling protective cap

Unscrew bolt (arrow) of protective cap.

Continue: II01/1 Fig.: I28/2

KME00617



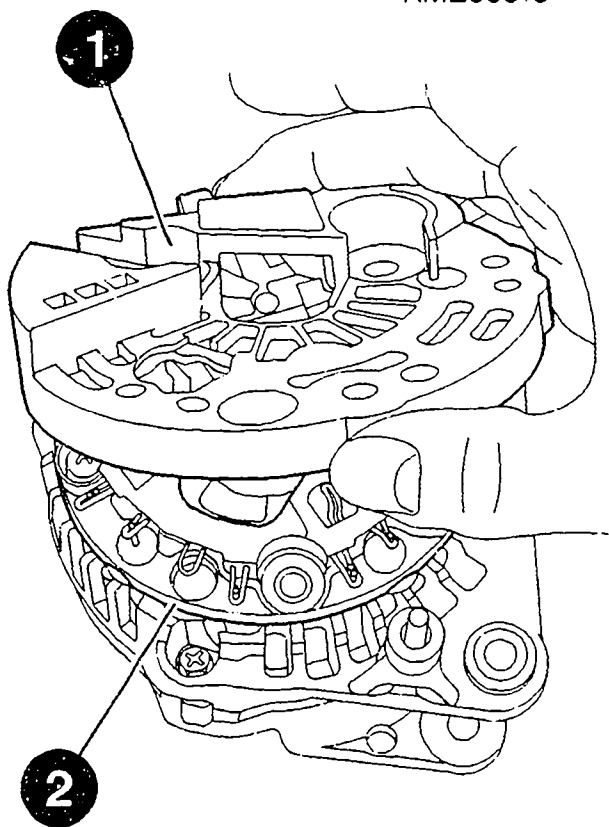
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling protective cap

Detach protective cap (1) from collector ring end shield and rectifier unit (2).

Continue: I22/1 Fig.: II01/2

KME00618



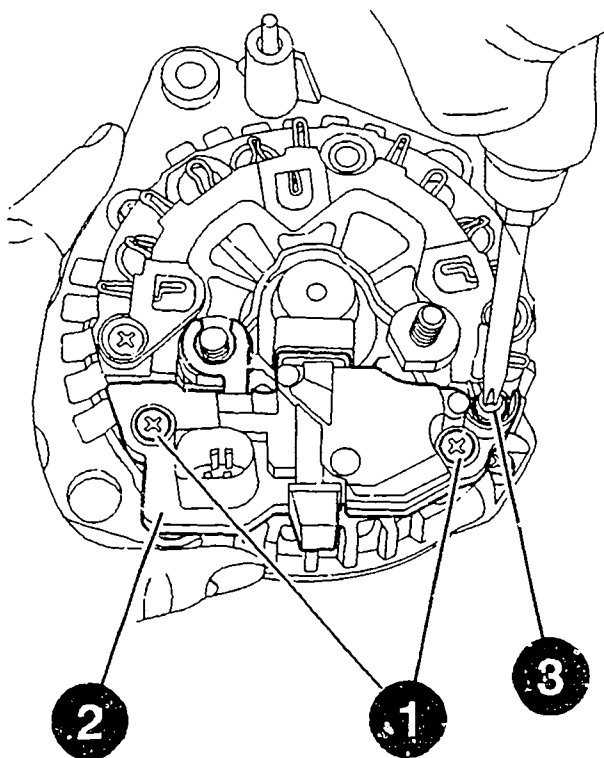
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling regulator

Unfasten and remove bolts (1) of regulator (2) and connection V (3).

Continue: II03/1 Fig.: II02/2

KME00619



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling regulator

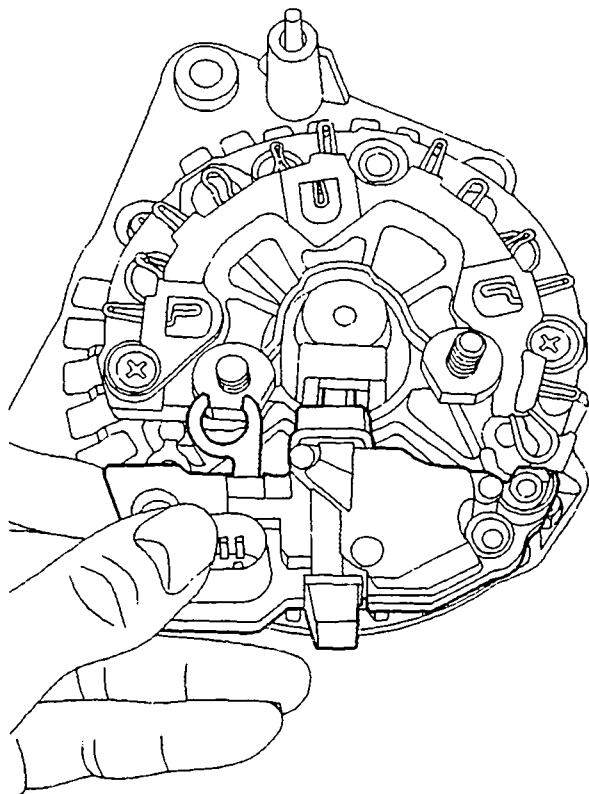
Detach regulator.

ATTENTION:

Take care not to damage carbon brushes.

Continue: I22/1 Fig.: I103/2

KME00620



DISMANTLING AND CHECKING ALTERNATOR

Checking (installed) rectifier

GENERAL:

- * Pointer of measuring instrument must be in green band for this test.
- * Renew entire rectifier if one or more diodes defective.

Continue: II04/2

DISMANTLING AND CHECKING ALTERNATOR

- * To ensure proper functioning of rectifier, alternator is to be checked on test bench or diodes checked individually with rectifier removed.

Continue: II05/1

DISASSEMBLING AND CHECKING ALTERNATOR

Checking (installed) rectifier unit

Check function of rectifier unit when connected to alternator tester. Pay attention to switch setting "ASSEMBLY" on tester.

Measurement points between:

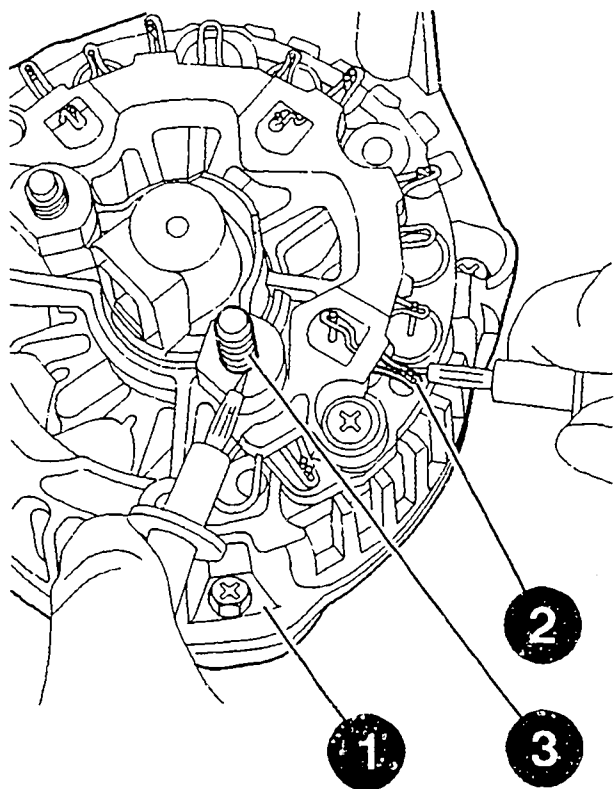
- * Housing (1) and stator connections (2)
- * Long B+ (3) and stator connections

Alternator tester:

0 684 201 200

Continue: I22/1 Fig.: II05/2

KME00621



DISASSEMBLING AND CHECKING ALTERNATOR

Checking (installed) stator

Check resistance between the corresponding winding ends.

Pay attention to switch setting on alternator tester.

Heed measuring range on tester.

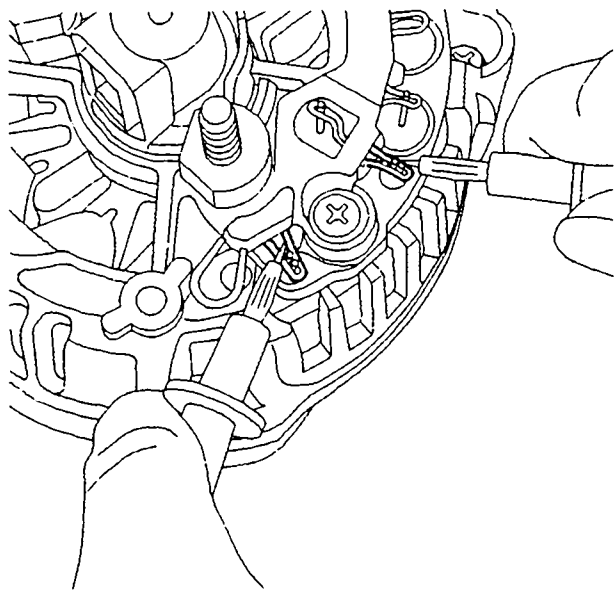
Stator resistance: < 0,1 Ohm

Alternator

tester: 0 684 201 200

Continue: I22/1 Fig.: I106/2

KME00622



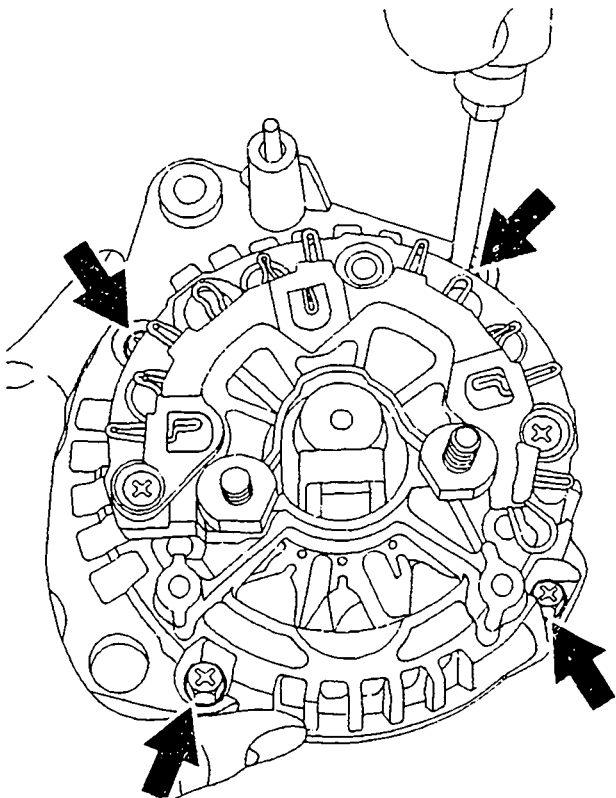
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling drive end shield

Unfasten and remove four hexagon bolts (arrows).

Continue: II08/1 Fig.: II07/2

KME00623



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling drive end shield

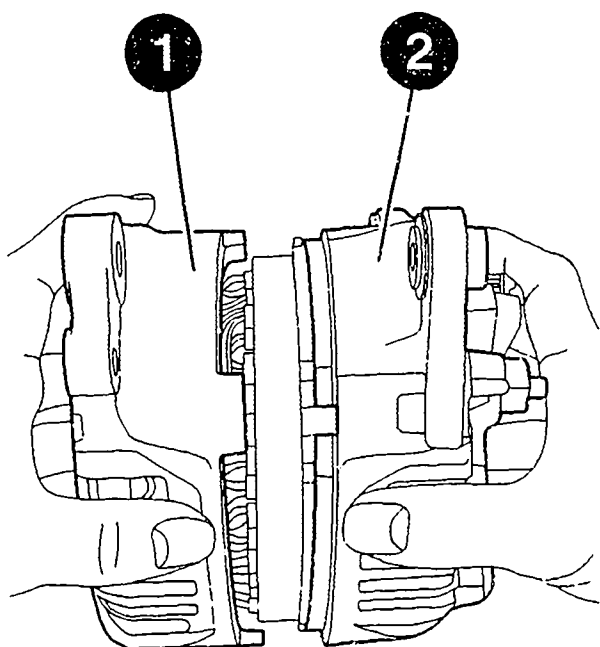
Pull drive end shield with rotor (1) out of collector ring end shield (2).

Note:

If necessary, separate drive end shield and collector ring end shield by tapping carefully with rubber-headed hammer.

Continue: II09/1 Fig.: II08/2

KME00624



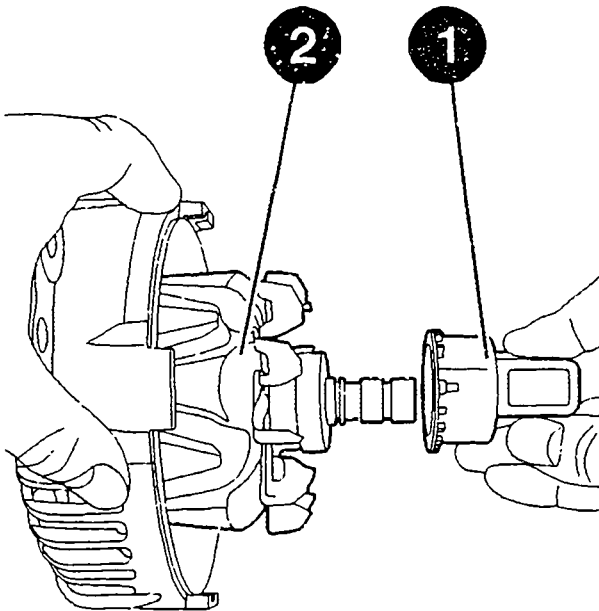
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling drive end shield

Detach fitting ring (1) from rotor shaft (2).

Continue: I22/1 Fig.: II09/2

KME00625



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling rotor

Position collector ring end of drive end shield with rotor (1) in support piece (2).

Use extraction tool (3) to pull drive end shield off rotor.

NOTE:

When applying extraction tool, it may be necessary to fit a separate puller arm. Apply puller arms at bearing seat of drive end shield.

Take care not to damage fan blades.

Support piece:

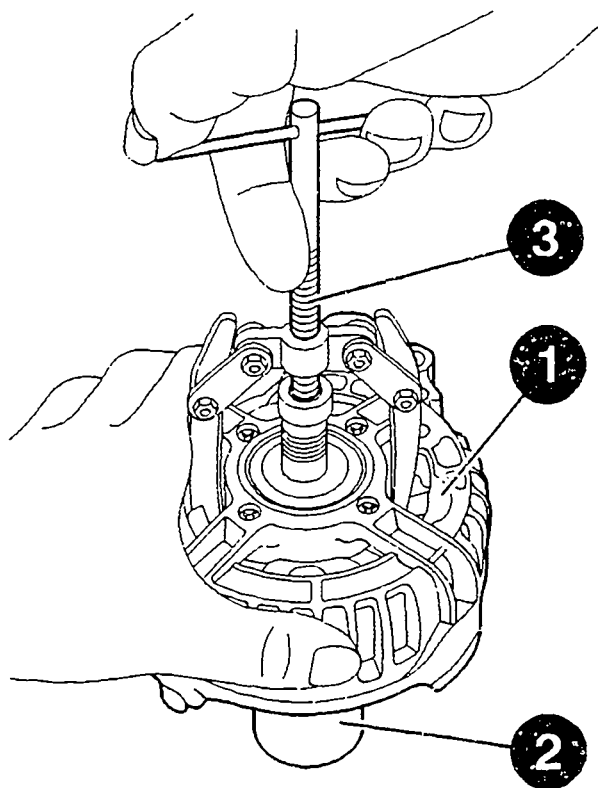
0 986 618 162

Extraction tool:

comm. avail.

Continue: II11/1 Fig.: II10/2

KME00626



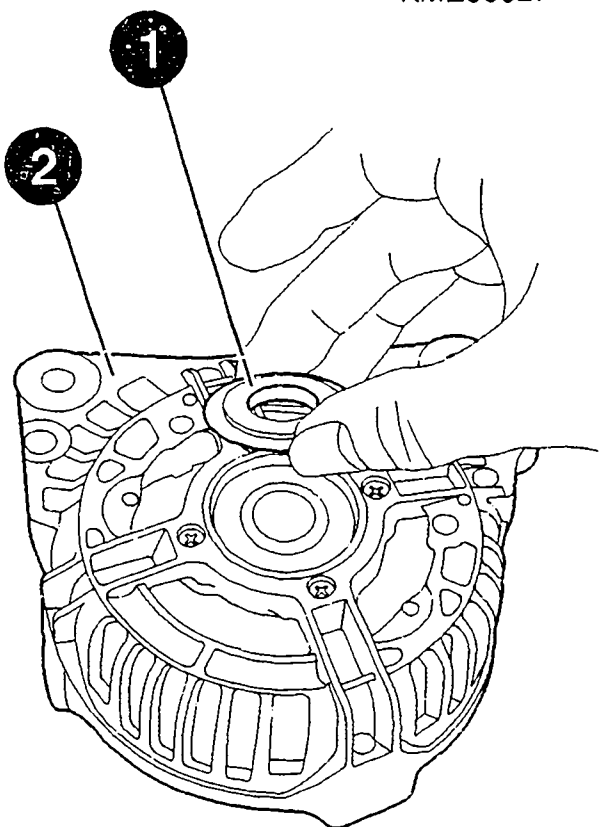
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling rotor

Detach spacer ring (1) from drive end shield (2).

Continue: I22/1 Fig.: II11/2

KME00627



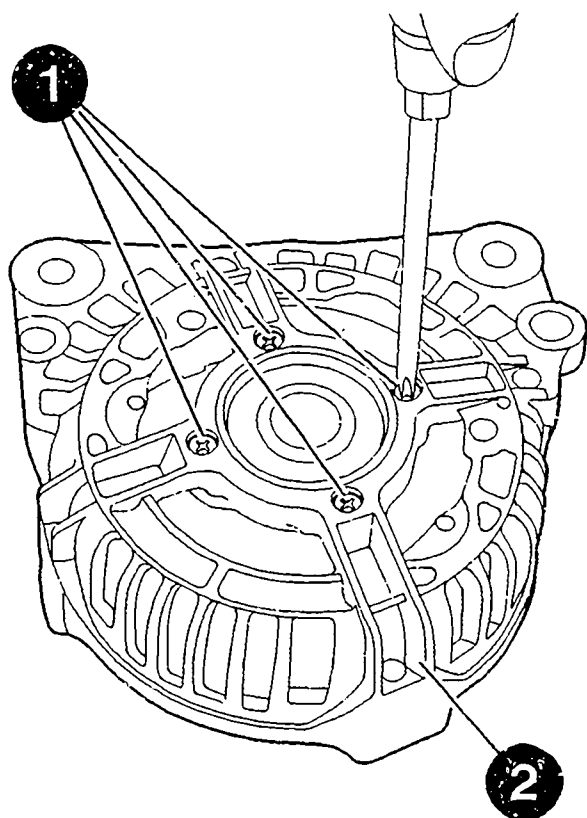
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of drive end shield

Unfasten four bolts (1) of drive end shield (2).

Continue: II13/1 Fig.: II12/2

KME00628



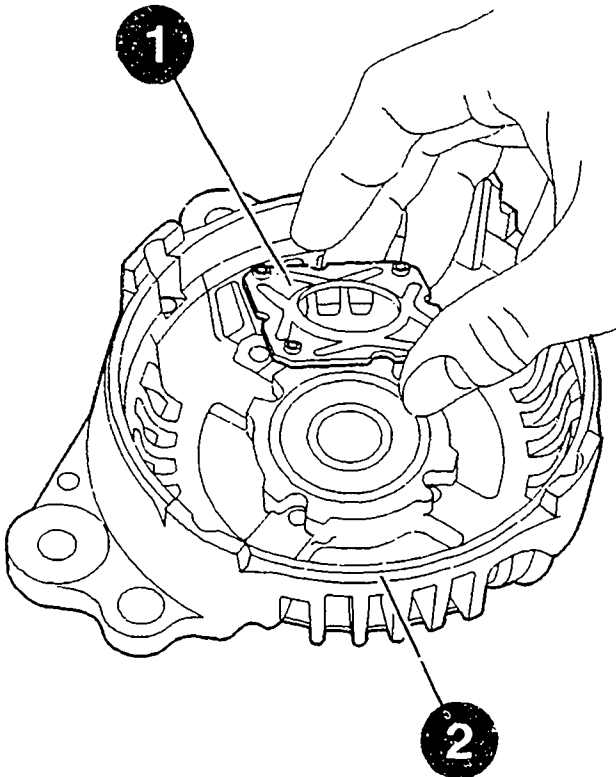
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of drive end shield

Detach cover plate (1) from drive end shield (2).

Continue: II14/1 Fig.: II13/2

KME00629



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing
of drive end shield

Place drive end shield (1) on press
and press deep-groove ball bearing (2)
with pressing-in sleeve (3) out of
drive end shield.

Mandrel press:

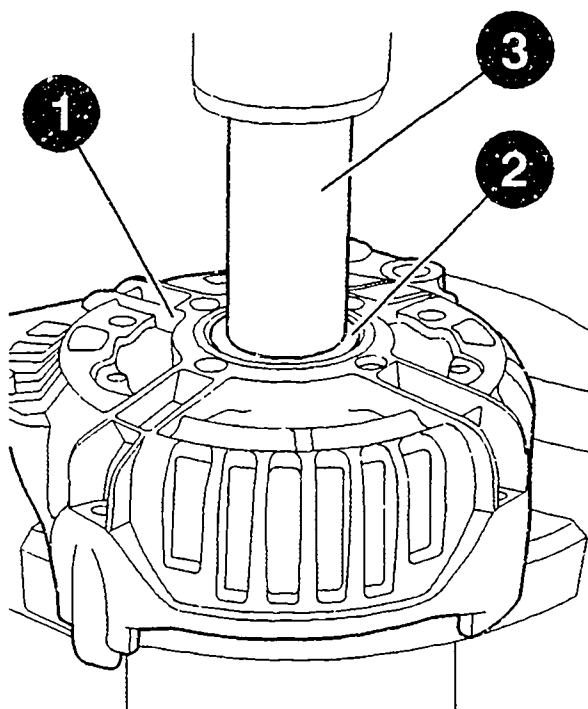
comm. avail.

Pressing-in sleeve:

0 986 618 162

Continue: I22/1 Fig.: II14/2

KME00630



DISASSEMBLING AND CHECKING ALTERNATOR

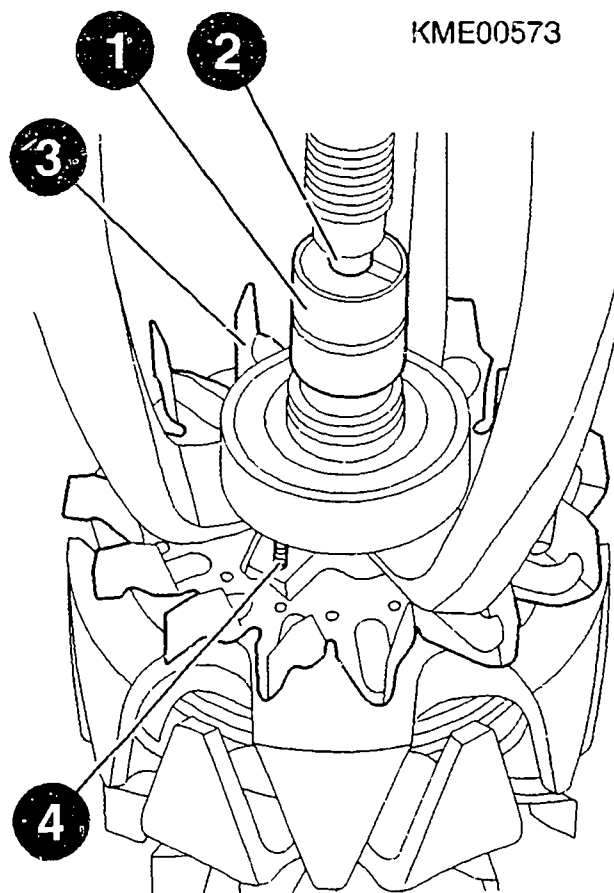
Disassembling deep-groove ball bearing of collector ring end shield

ATTENTION:

So as to avoid breaking collector ring assembly (1), pressing-off mandrel (2) must be applied to rotor shaft and never to actual collector ring assembly.

When pulling off, take care not to damage fan blades (3) and electrical connections (4) by turning claws of extraction tool.

Continue: II16/1 Fig.: II15/2



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of collector ring end shield

Position drive end of rotor (1) in support piece (2).

Use extraction tool (3) to pull deep-groove ball bearing (4) off rotor shaft.

Support piece:

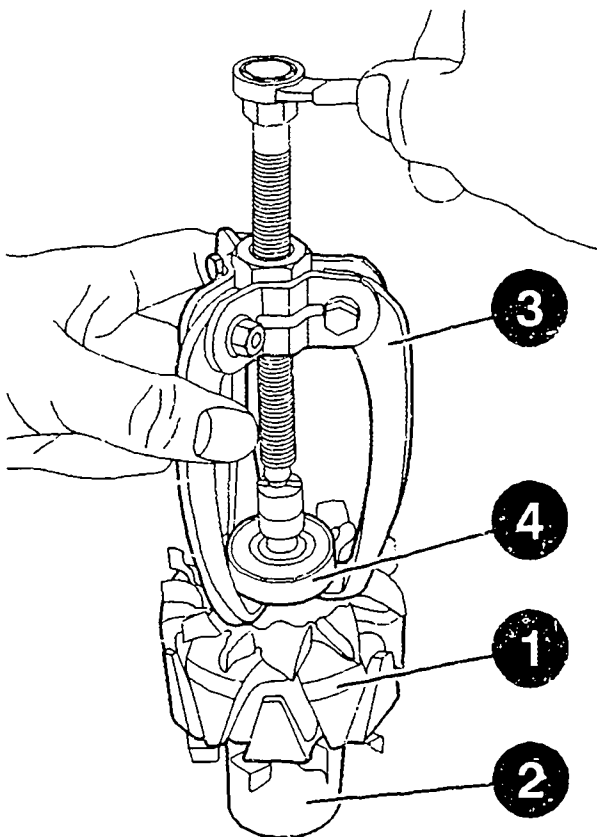
0 986 618 162

Extraction tool:

comm. avail.

Continue: I22/2 Fig.: II16/2

KME00631



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling rectifier unit

NOTE:

If checking with oscilloscope reveals that rectifier unit is OK, it is not necessary to separate rectifier unit/stator.

Continue: II18/1

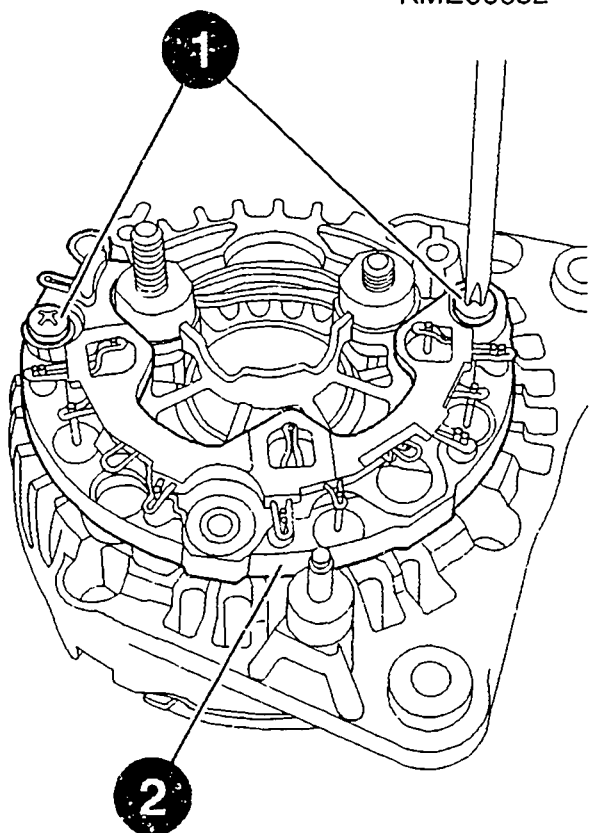
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling rectifier unit

Remove bolts (1) of rectifier unit (2).

Continue: II19/1 Fig.: II18/2

KME00632



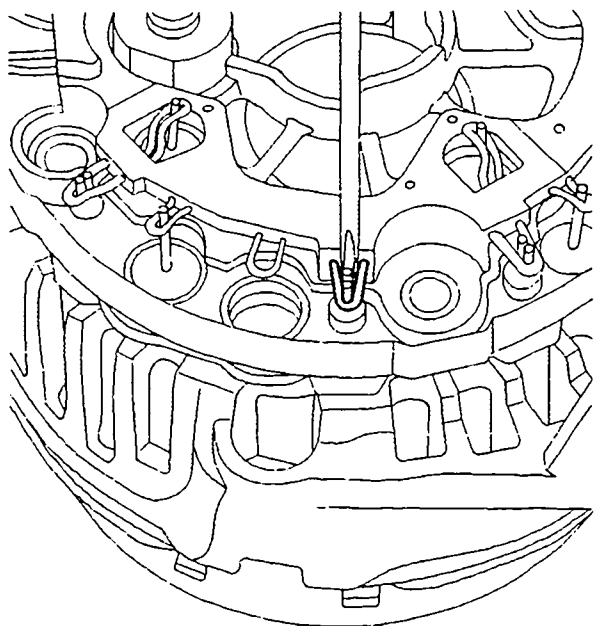
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling rectifier unit

Use suitable tool to carefully open all stator wire holders and detach stator wires.

Continue: II20/1 Fig.: II19/2

KME00633



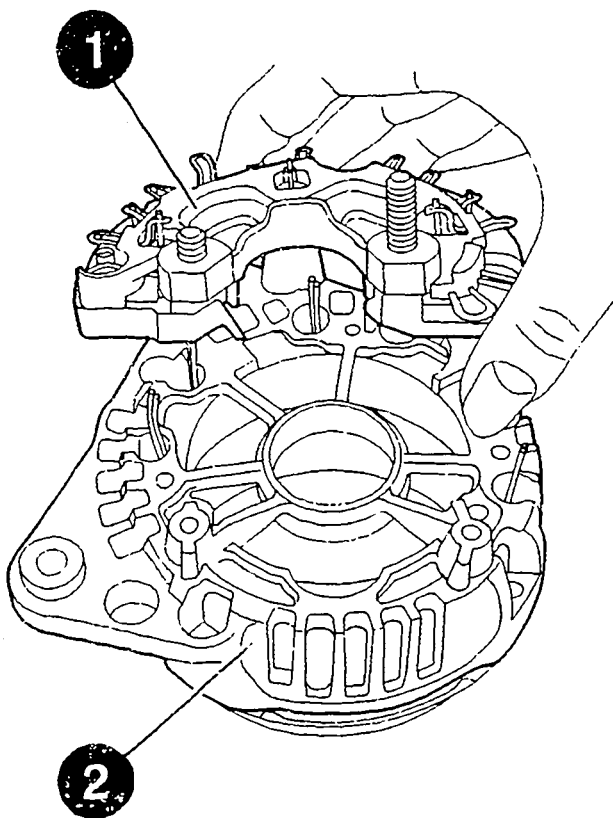
DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling rectifier unit

Detach rectifier unit (1) from
collector ring end shield (2).

Continue: I22/2 Fig.: II20/2

KME00634



DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling stator

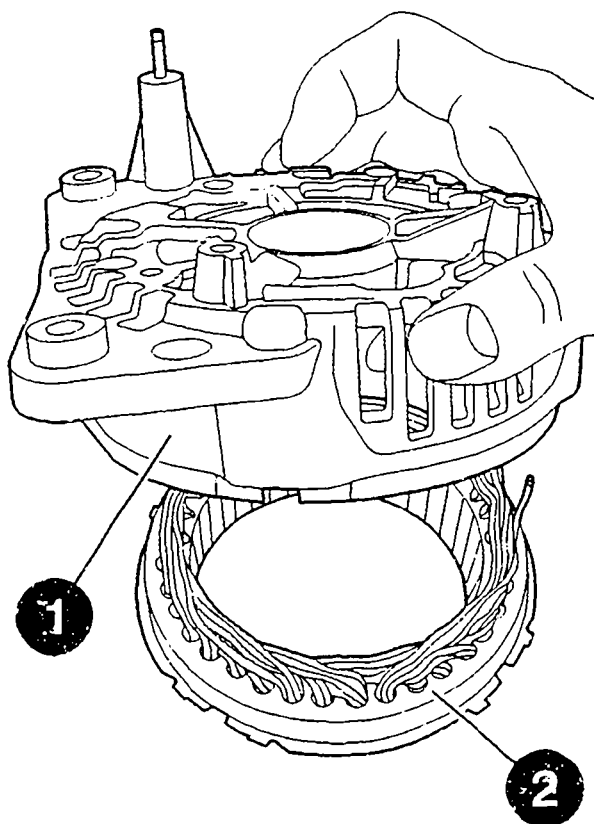
Lift collector ring end shield (1) off stator (2).

NOTE:

If necessary, separate stator and collector ring end shield by tapping carefully with a rubber-headed hammer.

Continue: I01/1 Fig.: II21/2

KME00635



COMPONENT CLEANING

ATTENTION: DANGER OF FIRE

For transmitter and receiver interference suppression purposes, alternators are fitted with capacitors with a long storage time.

When washing out alternator components, immersion in cleaning fluid may result in capacitor discharge and cause flammable liquids to ignite.

Continue: II22/2

COMPONENT CLEANING

For this reason, components with capacitors are only to be washed out using cleaning agents (e.g. HAKU 1025/5) which are not readily flammable.

Continue: II23/1

COMPONENT CLEANING

Always heed the following safety regulations:

- * German Order governing the use of flammable liquids (VbF).
 - * Accident prevention regulations for electrical systems and equipment.
 - * Safety regulations for the handling of chlorinated hydrocarbons:
 - For companies: ZH 1/222
 - For employees: ZH 1/129
- issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

Continue: II23/2

COMPONENT CLEANING

Outside Germany, pay attention to appropriate local regulations.

Skin protection:

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

Continue: I01/1

ALTERNATOR CHECKING/REPAIR TABLE

Checking regulator and carbon brushes	II25/1
Checking (removed) rectifier unit	II26/1
Checking interference suppression capacitor	II28/1
Checking (removed) stator	III01/2
Checking rotor (short to ground)	III03/1
Checking rotor (resistance)	III05/1
Checking rotor (concentricity)	III06/1
Replacing fitting ring in collector ring end shield	III08/1

Continue: I01/1

CHECKING AND REPAIRING ALTERNATOR

Checking regulator and carbon brushes

Check regulator for external damage.
Replace regulator if carbon brushes
have broken off or if projection "a"
is less than 6 mm.

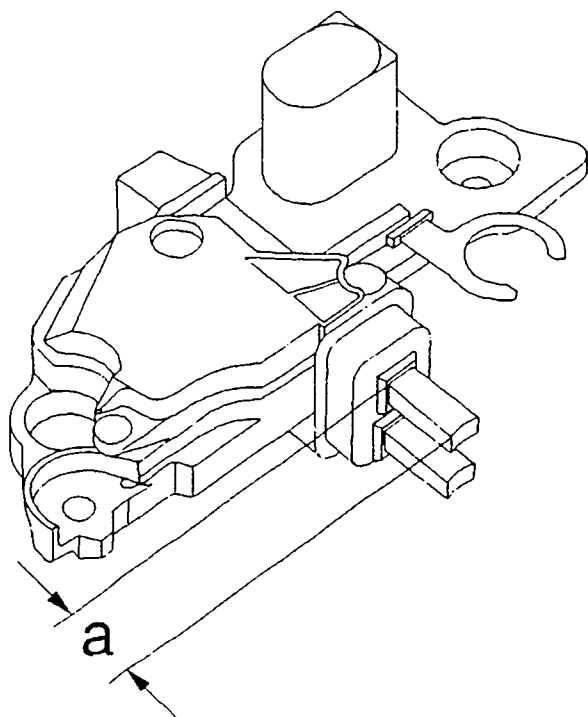
Check freedom of movement of carbon
brushes.

Projection of carbon brushes

New:	13,2 mm
Min.:	6 mm

Continue: II24/1 Fig.: II25/2

KME00636



CHECKING AND REPAIRING ALTERNATOR

Checking (removed) rectifier unit

GENERAL:

- * Checking of the individual diodes must be performed to ensure proper functioning of the rectifier unit.
- * The diodes are to be checked in both forward and reverse direction.

Continue: II26/2

CHECKING AND REPAIRING ALTERNATOR

- * Pointer of measuring instrument must be in green zone when checking in forward direction.
- * Pointer of measuring instrument must be in red zone when checking in reverse direction.

Continue: II27/1

CHECKING AND REPAIRING ALTERNATOR

Checking (removed) rectifier unit

Heed general notes.

Check function of rectifier unit with alternator tester.

Pay attention to switch setting

"INDIVIDUAL CHECK" on tester.

Measurement points between:

* Long B+ (1) and diode connections (2)

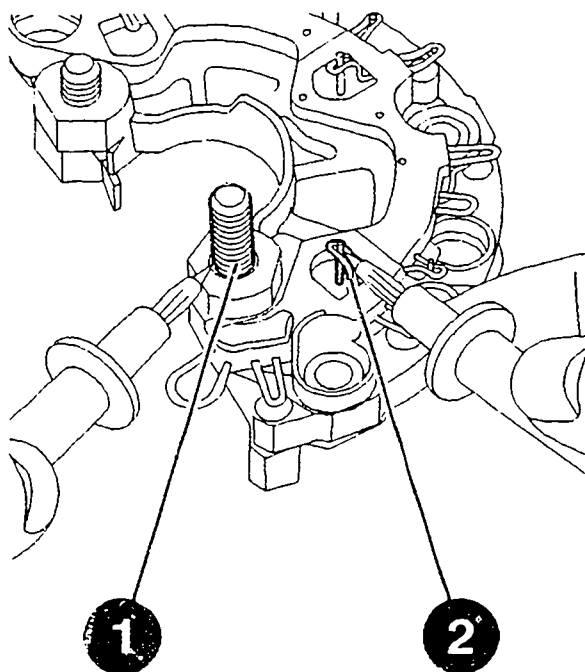
* Diode housing and diode connections

Alternator tester:

0 684 201 200

Continue: II24/1 Fig.: II27/2

KME00637



CHECKING AND REPAIRING ALTERNATOR

Checking interference suppression capacitor

Interference suppression capacitor is located in protective cap.

Measure capacitance of capacitor between B+ (1) and terminal lug (2).

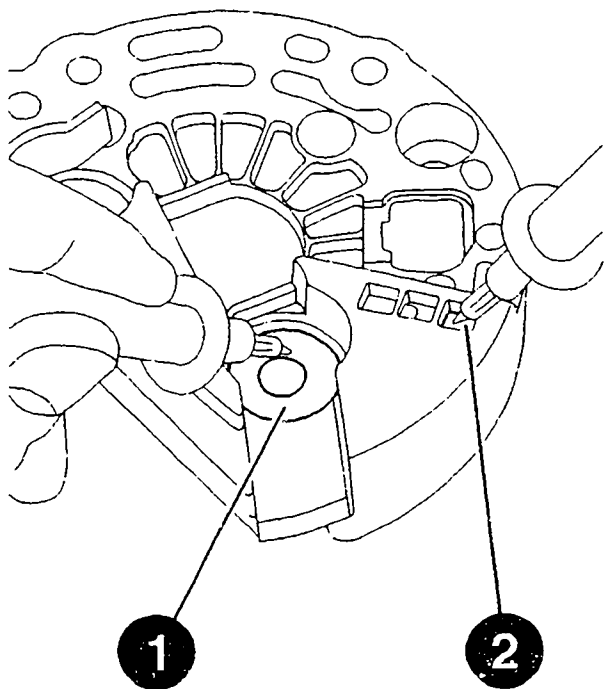
If set value is not attained, replace defective interference suppression capacitor with protective cap.

Set value: 2,0...2,4 microfarads

Electrical system tester: 0 684 101 400

Continue: IIII01/1 Fig.: II28/2

KME00638



CHECKING AND REPAIRING ALTERNATOR

Checking interference suppression capacitor

ATTENTION:

After checking, short and discharge interference suppression capacitor to prevent ignition of cleaning fluid when cleaning components.

Continue: II24/1

CHECKING AND REPLACING ALTERNATOR

Checking (removed) stator

ATTENTION:

Voltages of 80 V are POTENTIALLY FATAL.

When performing this check, it is imperative to ensure proper handling of the stator and all parts in electrical contact with it.

Continue: III02/1

CHECKING AND REPAIRING ALTERNATOR

Checking (removed) stator

Use test prods (1) to check stator for short to ground between housing (2) and winding ends (3).

Replace stator if defective.

Test voltage: 80 V AC

Interturn short-circuit
tester:

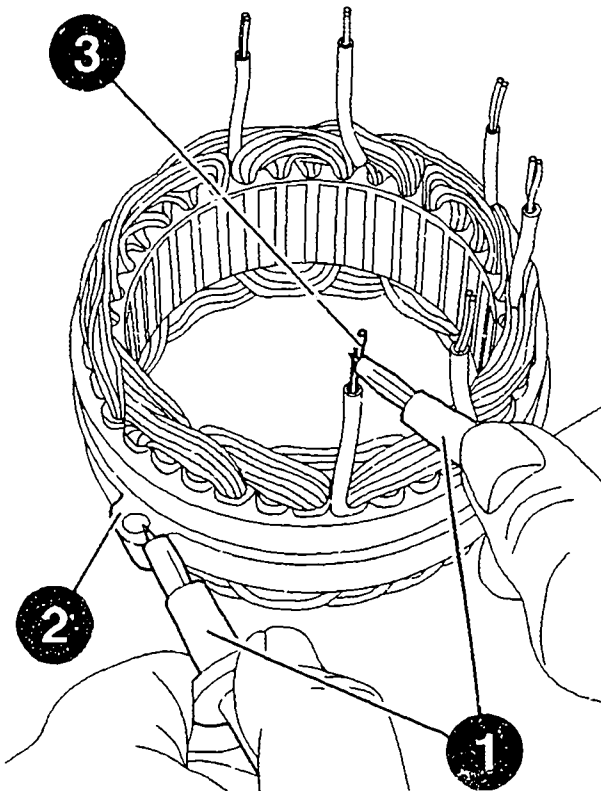
0 986 619 110

Test prods:

0 986 619 101

Continue: II24/1 Fig.: III02/2

KME00577



CHECKING AND REPLACING ALTERNATOR

Checking rotor (short to ground)

ATTENTION:

Voltages of 80 V are POTENTIALLY
FATAL.

When performing this check, it is
imperative to ensure proper handling
of the rotor and all parts in electri-
cal contact with it.

Continue: III04/1

CHECKING AND REPAIRING ALTERNATOR

Checking rotor (short to ground)

Use interturn short-circuit tester and test prods to check rotor for short to ground between collector ring (1) and rotor OD (2).

Test voltage:

80 V AC

Interturn short-circuit
tester:

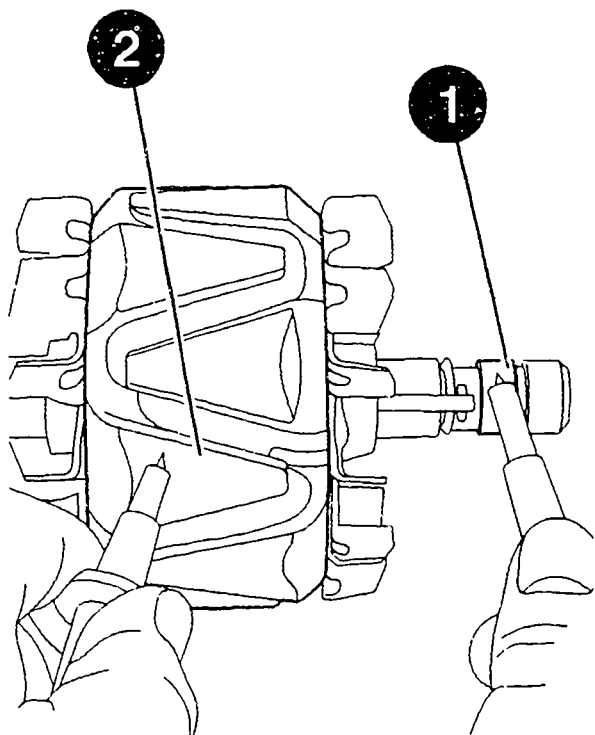
0 986 619 110

Test prods:

0 986 619 101

Continue: II24/1 Fig.: III04/2

KME00578



CHECKING AND REPAIRING ALTERNATOR

Checking rotor (resistance)

Use alternator tester to measure rotor resistance between collector rings.

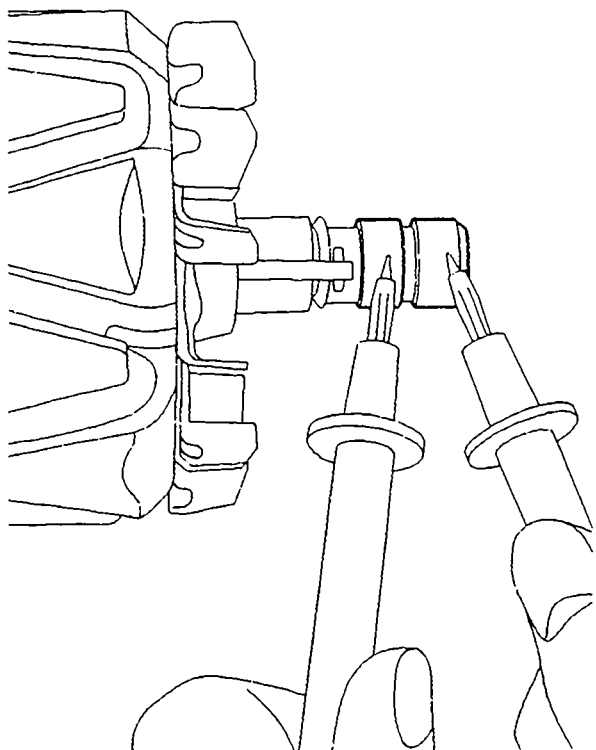
Observe measuring range on tester.

Resistance value: 1,8...2,8 Ohm

Alternator
tester: 0 684 201 200

Continue: II24/1 Fig.: III05/2

KME00579



CHECKING AND REPAIRING ALTERNATOR

Checking rotor (concentricity)

Position mounting points of rotor in V-blocks and perform precise horizontal alignment. Measure concentricity at OD of rotor with magnetic measurement stand and dial gauge.

Max. radial run-out at
rotor OD:

0,05 mm

Two V-blocks:

comm. avail.

Dial gauge:

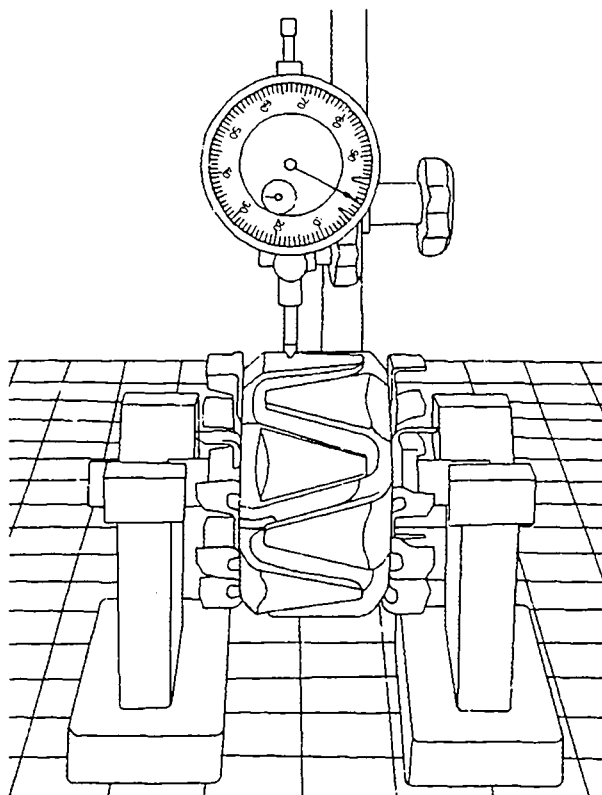
1 687 233 011

Magnetic measurement
stand:

4 851 601 124

Continue: III07/1 Fig.: III06/2

KME00580



CHECKING AND REPAIRING ALTERNATOR

Checking rotor (concentricity)

Measure concentricity at collector rings.

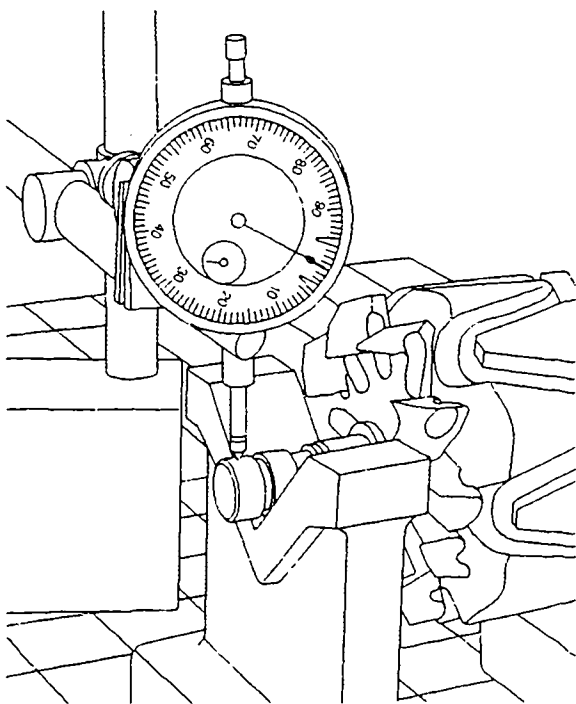
Max. radial run-out of collector rings: 0,03 mm

In the event of greater deviation or worn surface, turn down collector rings or renew rotor.
Pay attention to minimum diameter.

Min. diameter of collector rings: 14,9 mm

Continue: II24/1 Fig.: III07/2

KME00581



CHECKING AND REPAIRING ALTERNATOR

Replacing fitting ring in collector ring end shield

Fitting ring is always to be replaced.

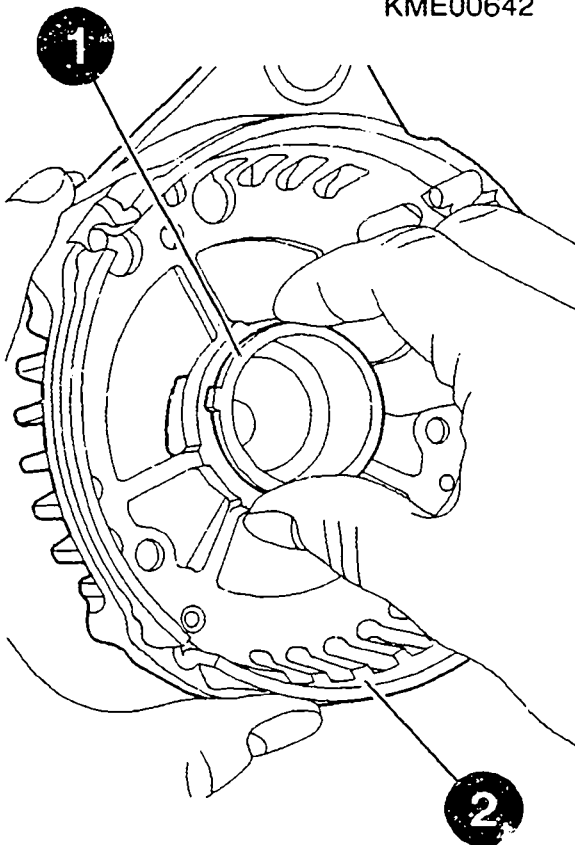
Insert new fitting ring (1) in collector ring end shield (2).

NOTE:

In the case of fitting rings with collector ring protection, recess for carbon brushes must be located between the two tapped holes for regulator attachment.

Continue: I01/1 Fig.: IIII08/2

KME00642



ALTERNATOR ASSEMBLY TABLE

Assembling deep-groove ball bearing of collector ring end shield	III10/1
Assembling deep-groove ball bearing of drive end shield	III12/1
Assembling rotor	III14/1
Assembling stator	III16/1
Assembling rectifier unit	III17/1
Assembling drive end shield and collector ring end shield	III21/1
Assembling regulator	III23/1
Assembling protective cap	III24/1
Fitting connections	III25/1
Assembling pulley	III26/1

Continue: I01/1

ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing
of collector ring end shield

Use is always to be made of a new
deep-groove ball bearing.

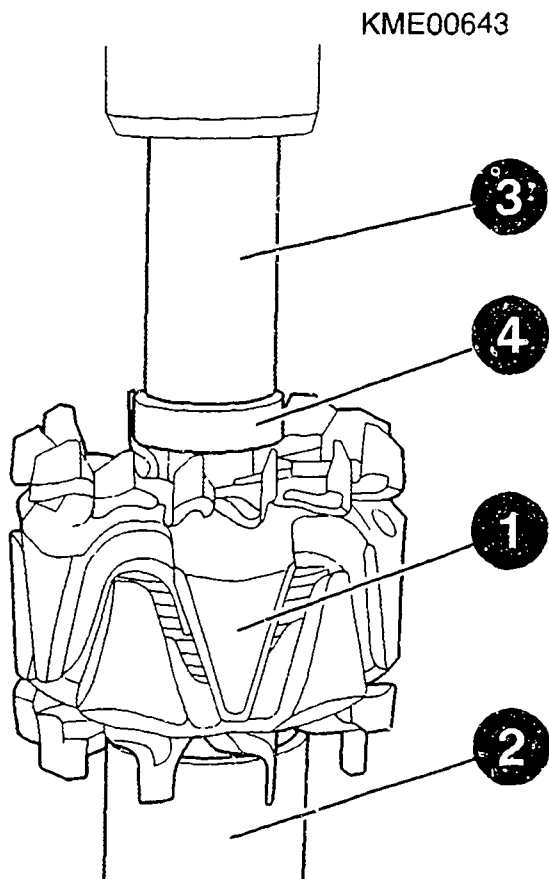
Mount drive end of rotor (1) on
support piece (2).

Centrally align pressing-in sleeve (3)
with new deep-groove ball bearing (4).

ATTENTION:

Failure to center pressing-in sleeve
may result in damage to collector
ring assembly.

Continue: IIII11/1 Fig.: IIII10/2



ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing
of collector ring end shield

Press home deep-groove ball bearing.

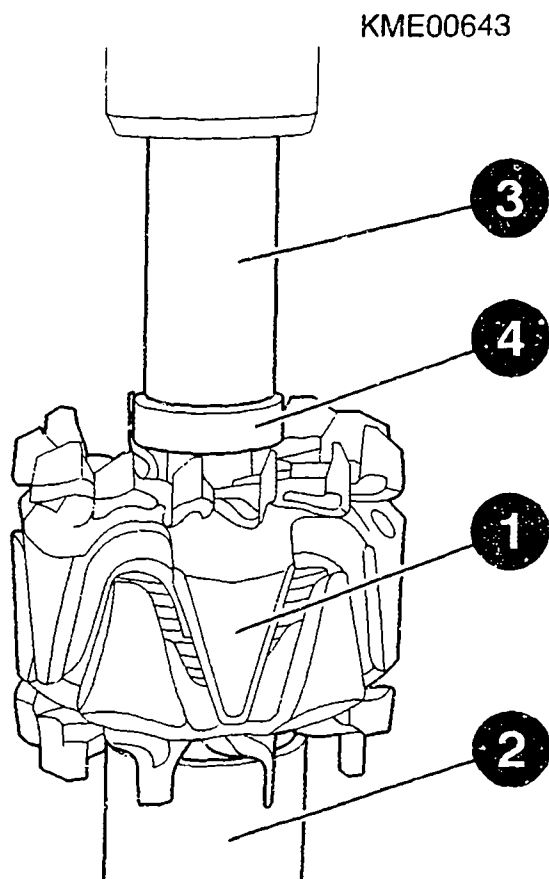
Mandrel press:

comm. avail.

Support piece and
pressing-in sleeve:

0 986 618 162

Continue: IIII09/1 Fig.: IIII11/2



ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing of drive end shield

Use is always to be made of a new deep-groove ball bearing, new bolts and a new cover plate.

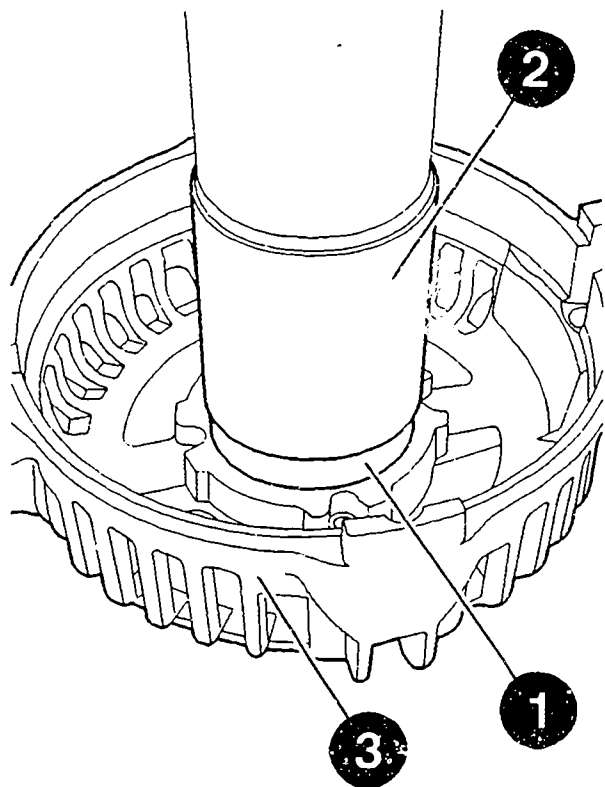
Press new deep-groove ball bearing (1) with support piece (2) into drive end shield (3).

Support piece:
Mandrel press:

0 986 618 162
comm. avail.

Continue: III13/1 Fig.: III12/2

KME00644



ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing
of drive end shield

Attach cover plate with four bolts (1)
to drive end shield (2). Make use
of torque wrench.

NOTE:

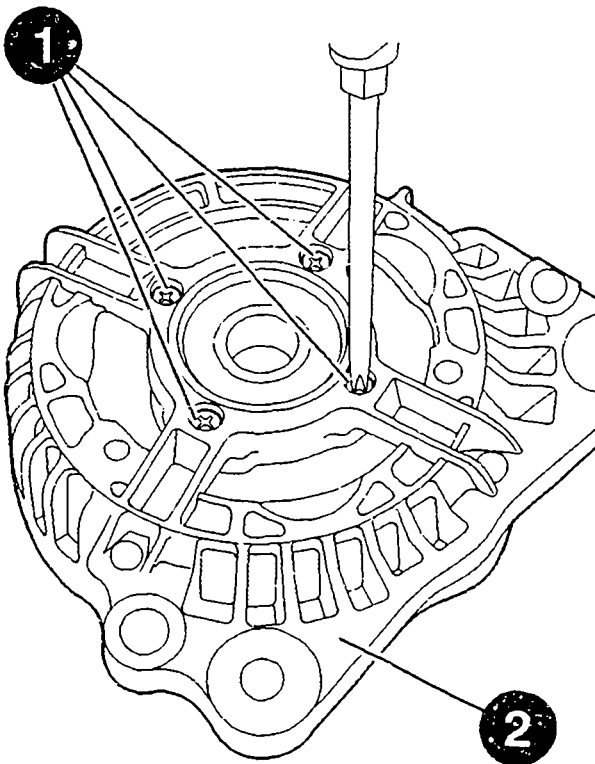
Collar of bolt holes of cover plate
faces away from deep-groove ball
bearing.

Tightening torque: 2,7...3,5 Nm

Torque wrench: comm. avail.

Continue: IIII09/1 Fig.: IIII13/2

KME00645



ASSEMBLING ALTERNATOR

Assembling rotor

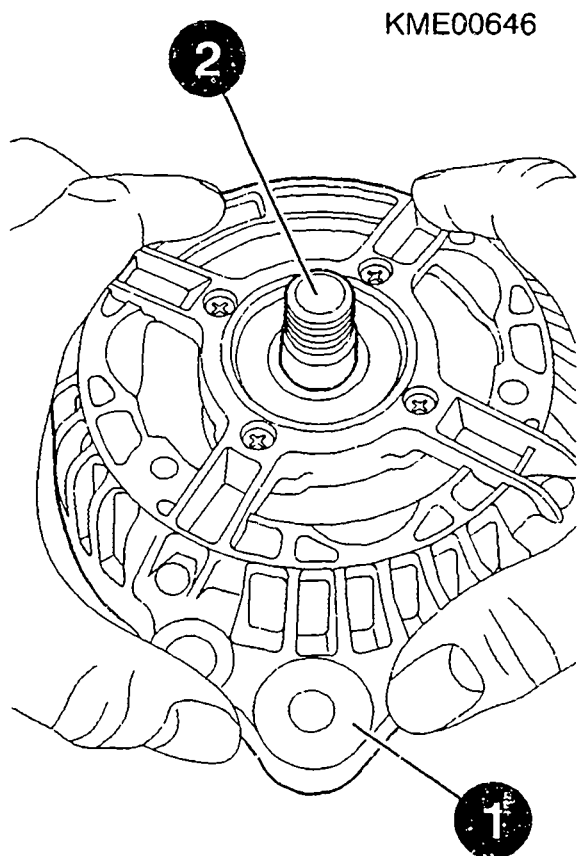
Insert collector ring end of rotor in support piece.

Slip drive end shield (1) onto rotor (2) by hand.

Support piece:

0 986 618 162

Continue: III15/1 Fig.: III14/2



ASSEMBLING ALTERNATOR

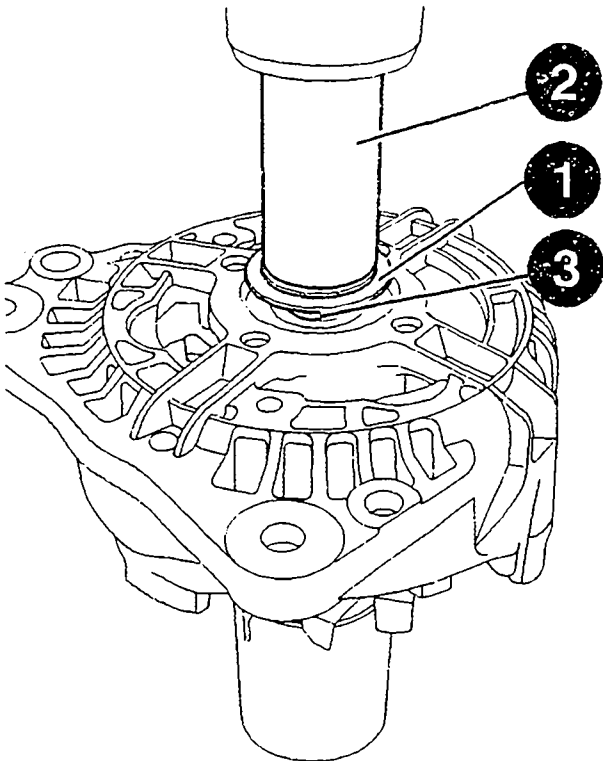
Assembling rotor

Press spacer ring (1) (small collar facing deep-groove ball bearing, large collar facing pulley) with pressing-in sleeve (2) onto rotor shaft (3).

Mandrel press:	comm. avail.
Support piece and pressing-in sleeve:	0 986 618 162

Continue: IIII09/1 Fig.: IIII15/2

KME00647



ASSEMBLING ALTERNATOR

Assembling stator

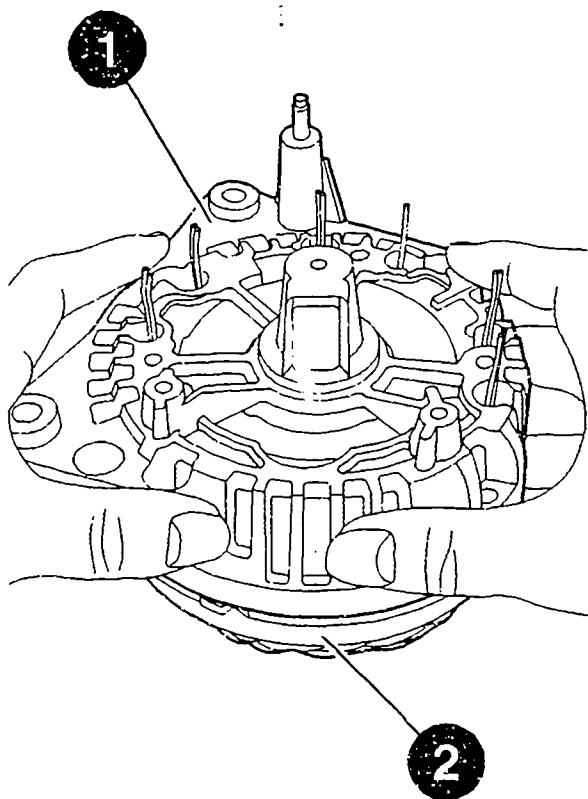
Render stator wires mechanically bright.

Position collector ring end shield (1) on stator (2).

Bend stator wires straight if necessary.

Continue: IIII09/1 Fig.: IIII16/2

KME00648



ASSEMBLING ALTERNATOR

Assembling rectifier unit

Render stator wire connections mechanically bright.

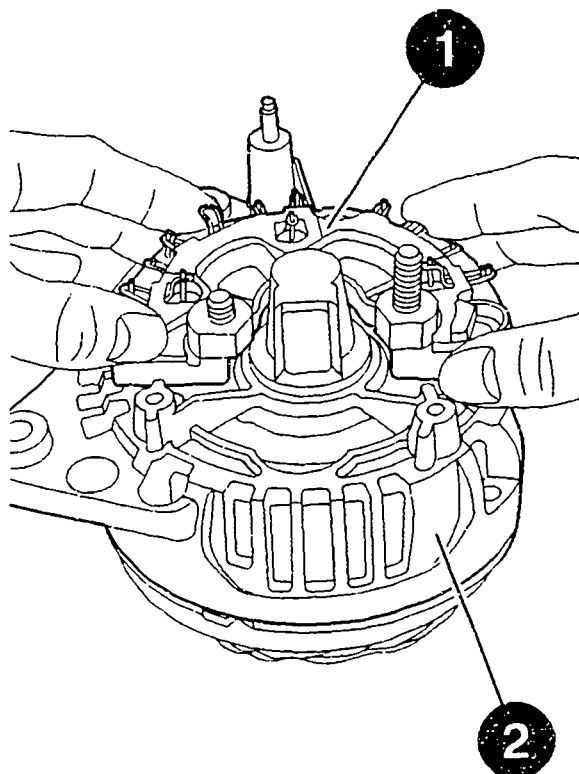
Position rectifier unit (1) on collector ring end shield (2).

NOTE:

Ensure proper wire routing through stator wire connections.

Continue: III18/1 Fig.: III17/2

KME00649



ASSEMBLING ALTERNATOR

Assembling rectifier unit

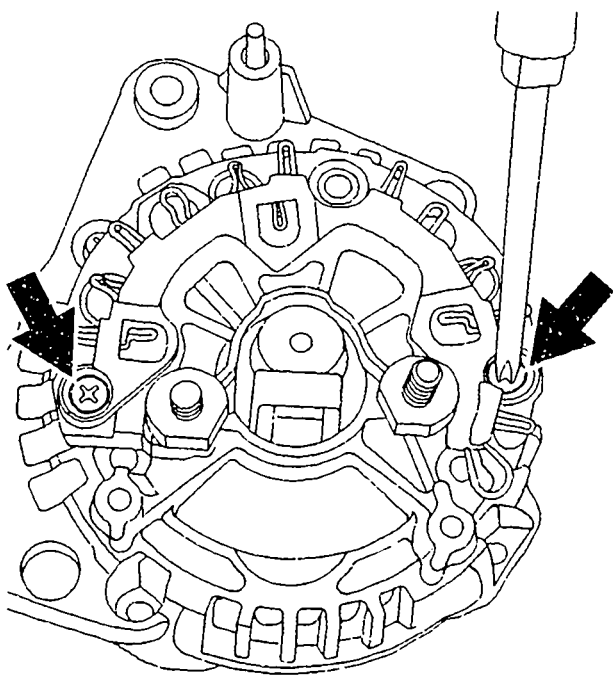
Use torque wrench to tighten bolts
(arrows).

Tightening torque: 3,5...4,3 Nm

Torque wrench: comm. avail.

Continue: III19/1 Fig.: III18/2

KME00650



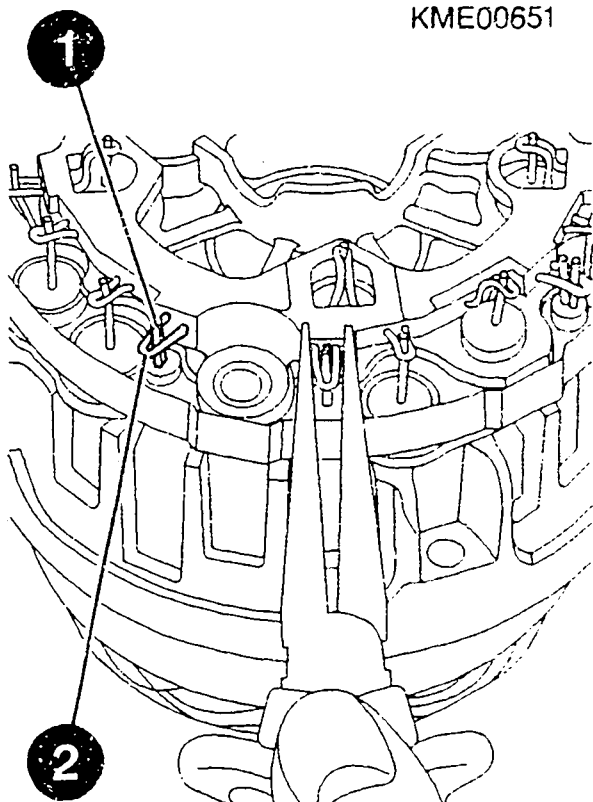
ASSEMBLING ALTERNATOR

Assembling rectifier unit

Fix stator wires (1) in position by squeezing together stator wire connections (2) at rectifier unit.

Continue: III20/1 Fig.: III19/2

KME00651



ASSEMBLING ALTERNATOR

Assembling rectifier unit

Solder stator wires to stator
wire connections.

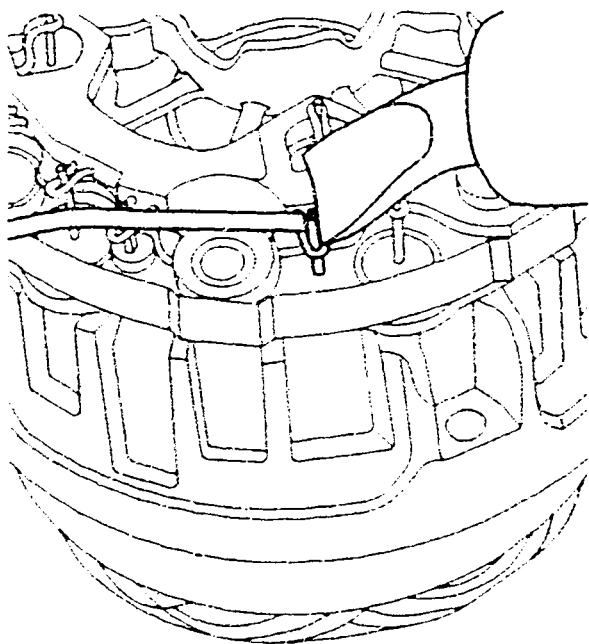
ATTENTION:

Always make use of high-temperature
solder (min. 480 C) and solder cream.

Soldering iron 180 W:	comm. avail.
Solder cream:	comm. avail.
High-temperature solder (min. 480 C):	comm. avail.

Continue: III109/1 Fig.: III20/2

KME00652



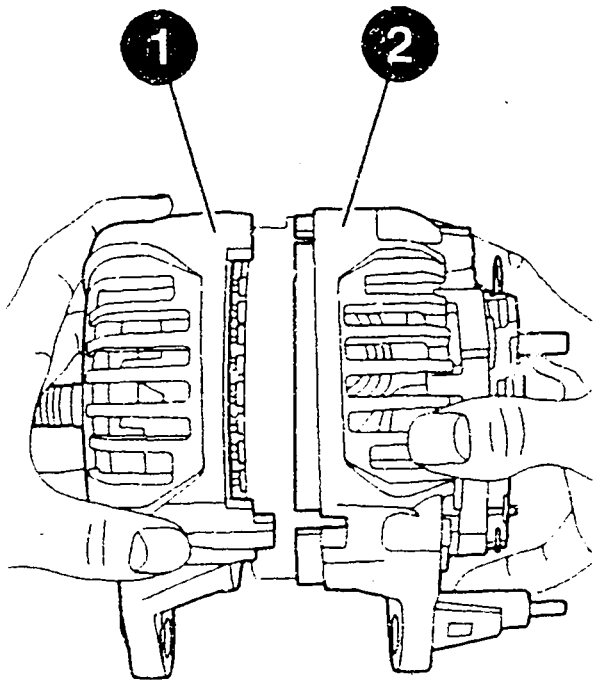
ASSEMBLING ALTERNATOR

Assembling drive end shield and
collector ring end shield

Insert rotor together with drive end
shield (1) in collector ring end
shield (2).

Continue: III22/1 Fig.: III21/2

KME00653



ASSEMBLING ALTERNATOR

Assembling drive end shield and
collector ring end shield

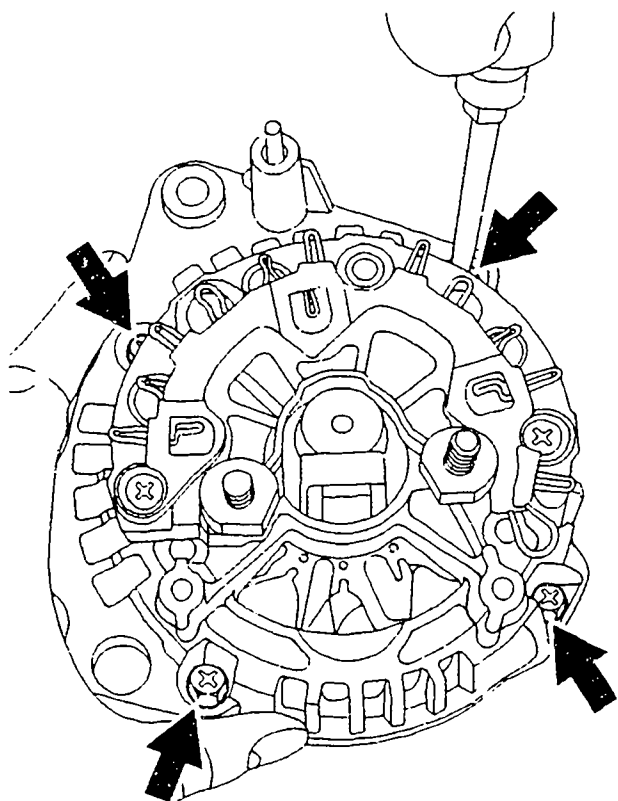
Fit bolts (arrows) and then tighten
using torque wrench.

Tightening torque: 4,5...5,5 Nm

Torque wrench: comm. avail.

Continue: III09/1 Fig.: III22/2

KME00654



ASSEMBLING ALTERNATOR

Assembling regulator

Use bolts (3) to attach regulator (1) to collector ring end shield (2).

Use bolt (4) to attach connection V. Make use of torque wrench.

NOTE:

Pay attention to carbon brushes on installation.

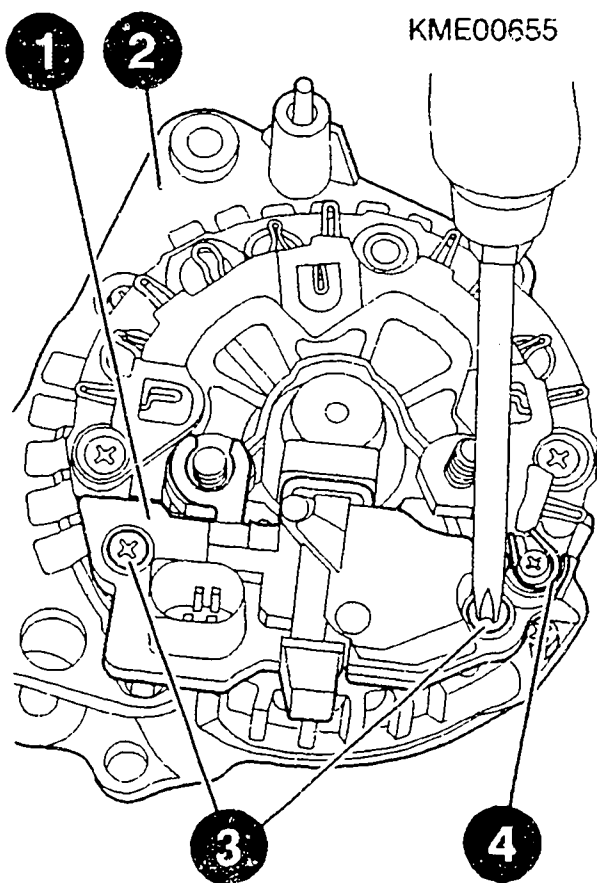
Tightening torques

Regulator bolts: 1,6...2,3 Nm

Bolt for connection V: 0,9...1,4 Nm

Torque wrench: comm. avail.

Continue: IIII09/1 Fig.: IIII23/2



ASSEMBLING ALTERNATOR

Assembling protective cap

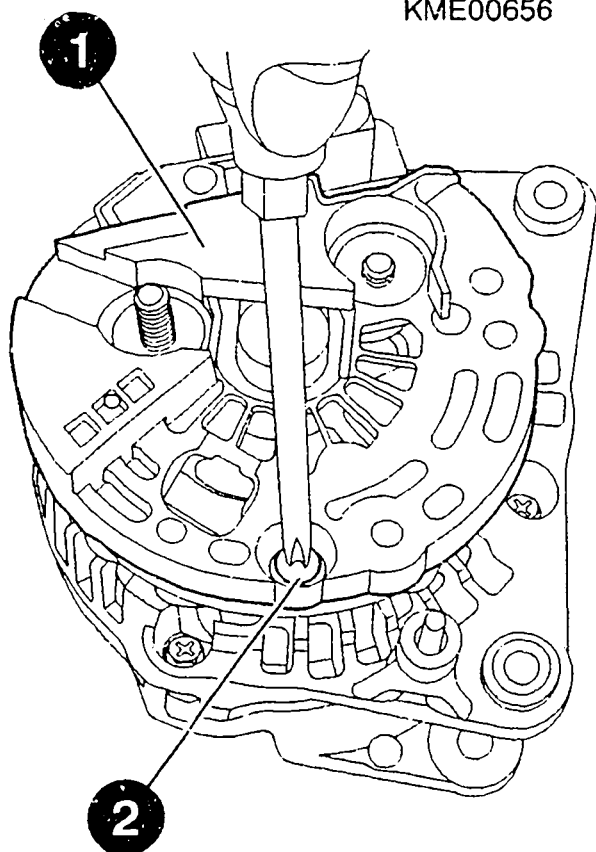
Attach protective cap (1) to rectifier unit and secure with bolt (2).
Use torque wrench.

Tightening torque: 3,5...4,3 Nm

Torque wrench: comm. avail.

Continue: IIII09/1 Fig.: IIII24/2

KME00656



ASSEMBLING ALTERNATOR

Fitting connections

Attach connections long B+ (1), short B+ (2) and terminal W (if fitted).
Use torque wrench.

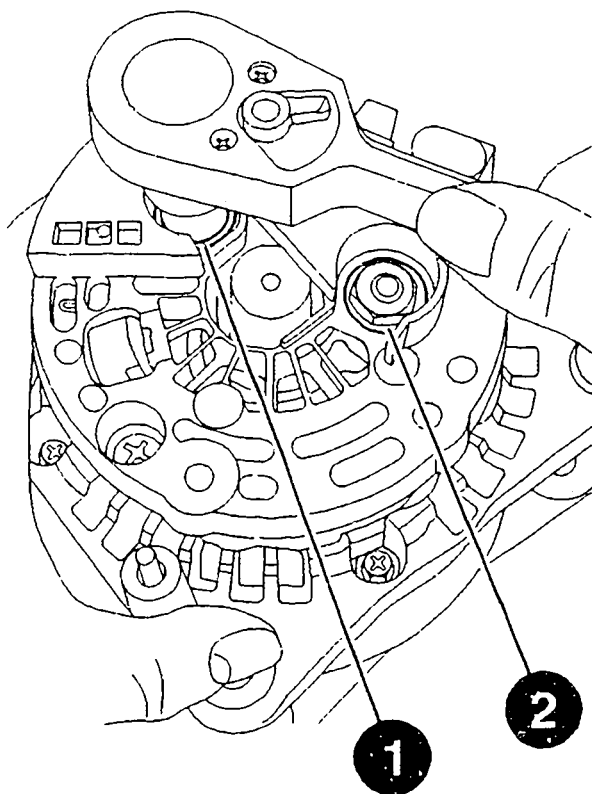
Tightening torques

Long B+:	18...20 Nm
Short B+:	11...13 Nm

Torque wrench:	comm. avail.
----------------	--------------

Continue: III09/1 Fig.: III25/2

KME00616



ASSEMBLING ALTERNATOR

Assembling pulley

Attach socket wrench (1) to nut of pulley (2).

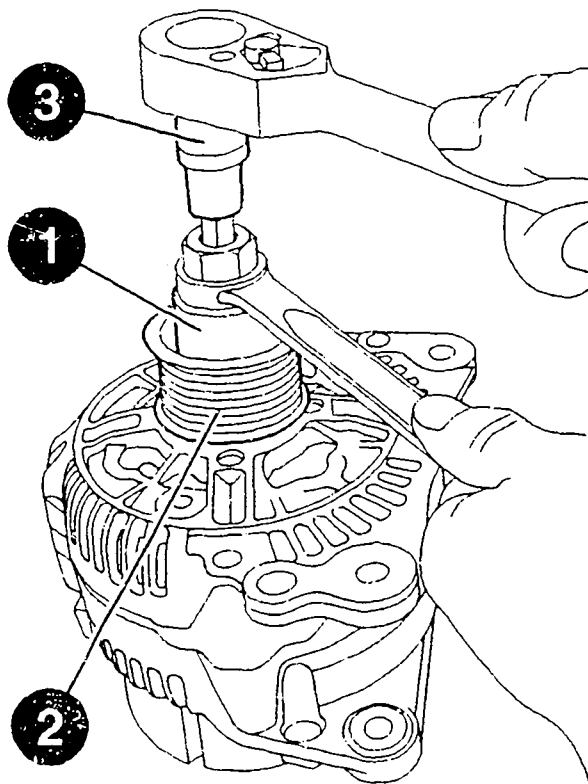
Hold rotor shaft of alternator with multi-point wrench (3) and tighten nut using 22 mm box wrench. Use torque wrench.

Tightening torque: 60...70 Nm

Torque wrench:	comm. avail.
Socket wrench:	0 986 618 152
M10 multi-point socket, long version:	comm. avail.

Continue: III27/1 Fig.: III26/2

KME00552



ASSEMBLING ALTERNATOR

Assembling pulley (free-wheel pulley)

Insert disassembly tool (1) in
grooved toothing of free-wheel
pulley (2).

Hold rotor shaft of alternator with
multi-point wrench (3) and tighten
free-wheel pulley by way of disassembly
tool using 17 mm box wrench.

Use torque wrench.

Tightening torque:

75...85 Nm

Torque wrench:

comm. avail.

Disassembly tool:

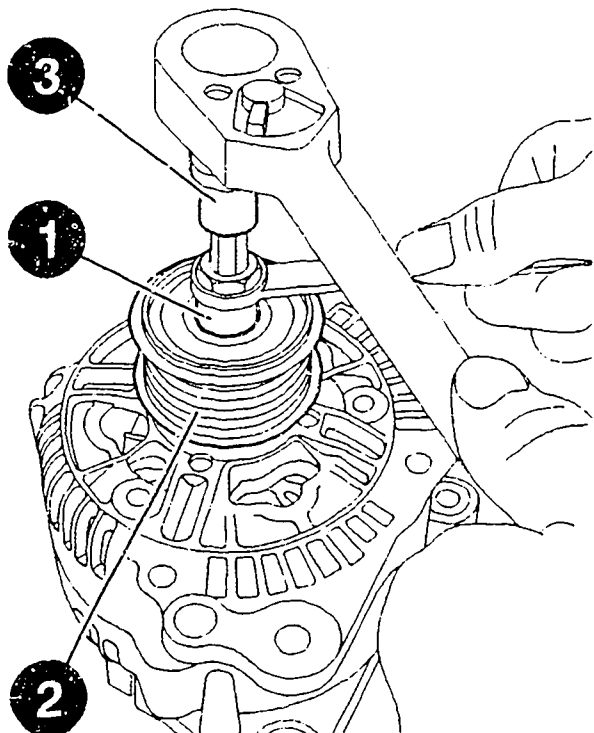
0 986 619 396

M10 multi-point socket,
long version:

comm. avail.

Continue: III28/1 Fig.: III27/2

KME00553



ASSEMBLING ALTERNATOR

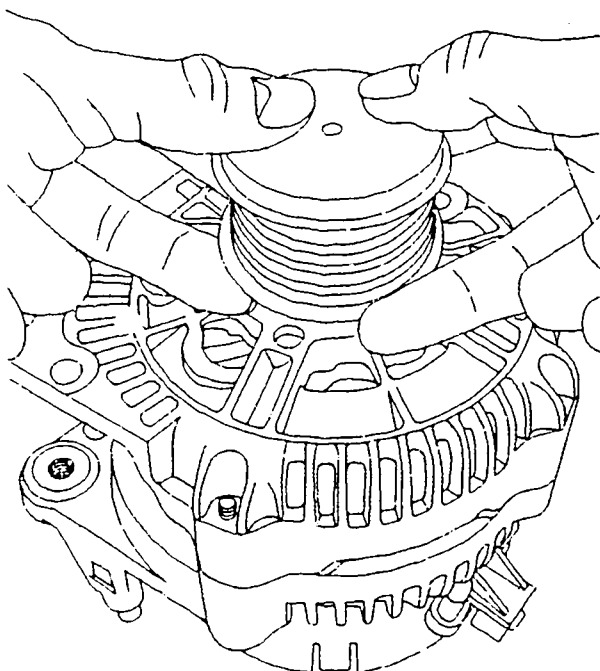
Assembling pulley

Cap is always to be renewed.

Fit clip-on pulley cap.

Continue: IV01/1 Fig.: III28/2

KME00597



ASSEMBLING ALTERNATOR

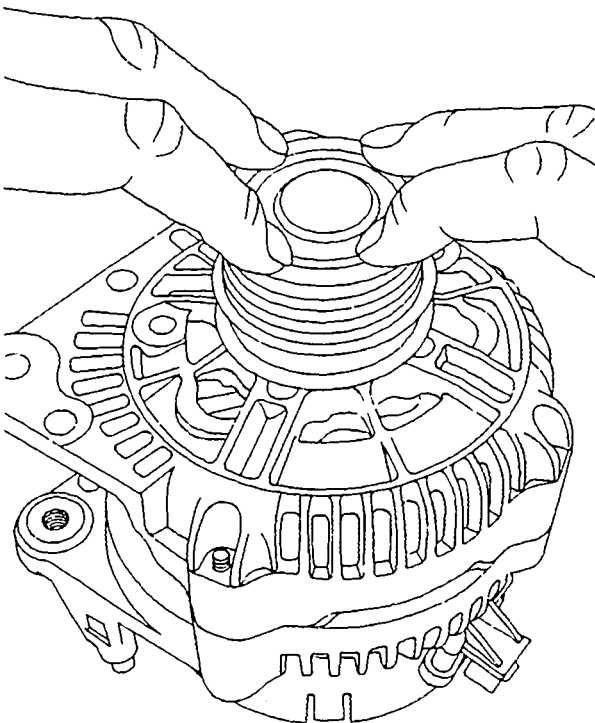
Assembling pulley

Cap is always to be renewed.

Fit press-in pulley cap.

Continue: I01/1 Fig.: IV01/2

KME00598



EDITORIAL NOTE

Copyright 1999 ROBERT BOSCH GmbH
Automotive-Equipment After-Sales
Service
Technical Publications Department
KH/VDT,
Postfach 30 02 20, D-70422 Stuttgart

Published by:
After-Sales Service Department for
Training and
Technology (KH/VSK).
Time of going to press 02.1999.
Please direct questions and comments
concerning the contents to our
authorized representative in your
country.

Continue: IV02/2

EDITORIAL NOTE

The contents of this microcard are
intended only for the Bosch Franchised
After-Sales Organization. Passing on
to third parties is not permitted.

Microfilmed in the Federal Republic of
Germany.

Continue: I01/1